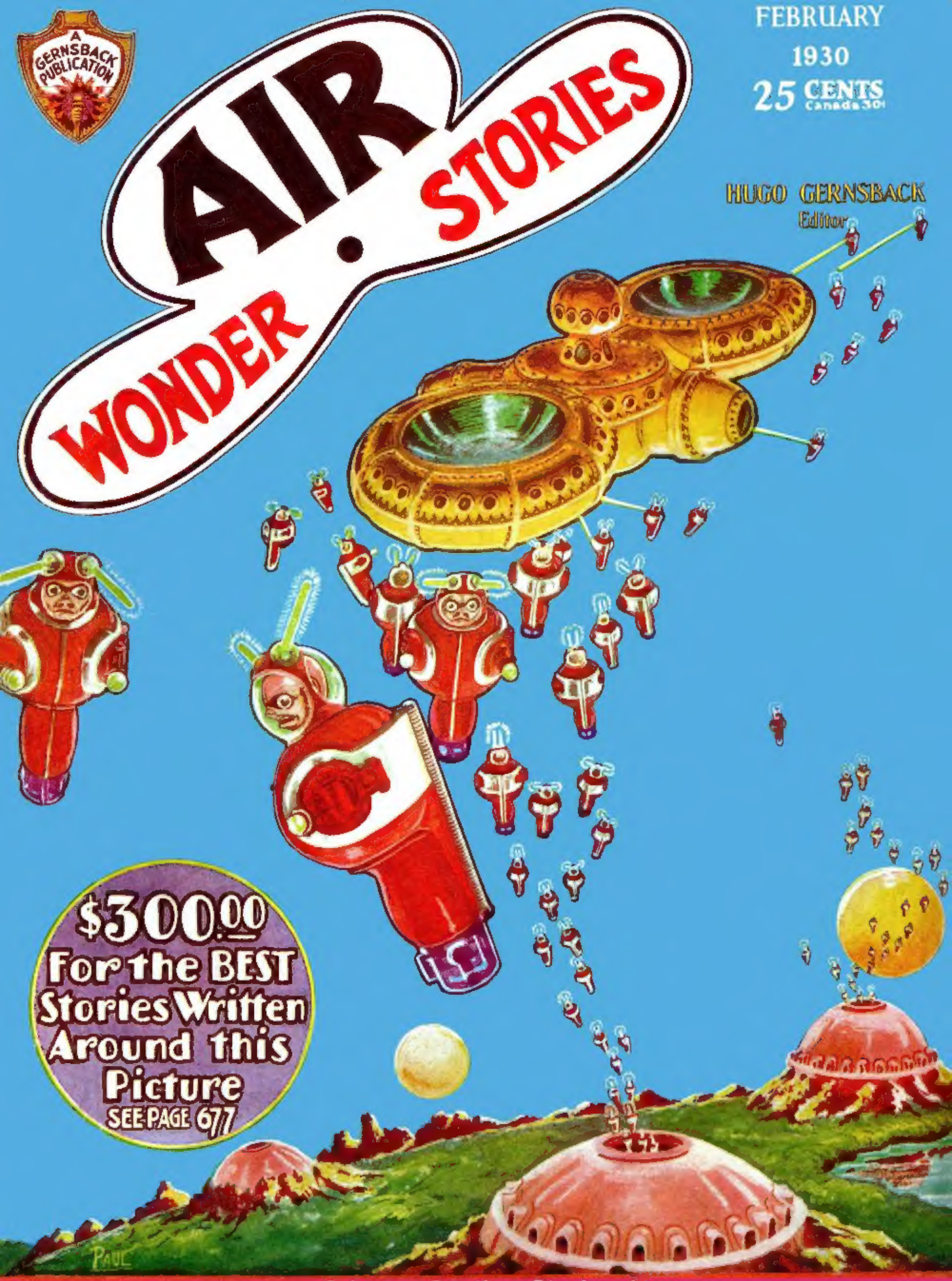
A GERNSBACK PUBLICATION

AIR WONDER STORIES

FEBRUARY
1930
25 CENTS
Canada 30¢

HUGO GERNSBACK
Editor



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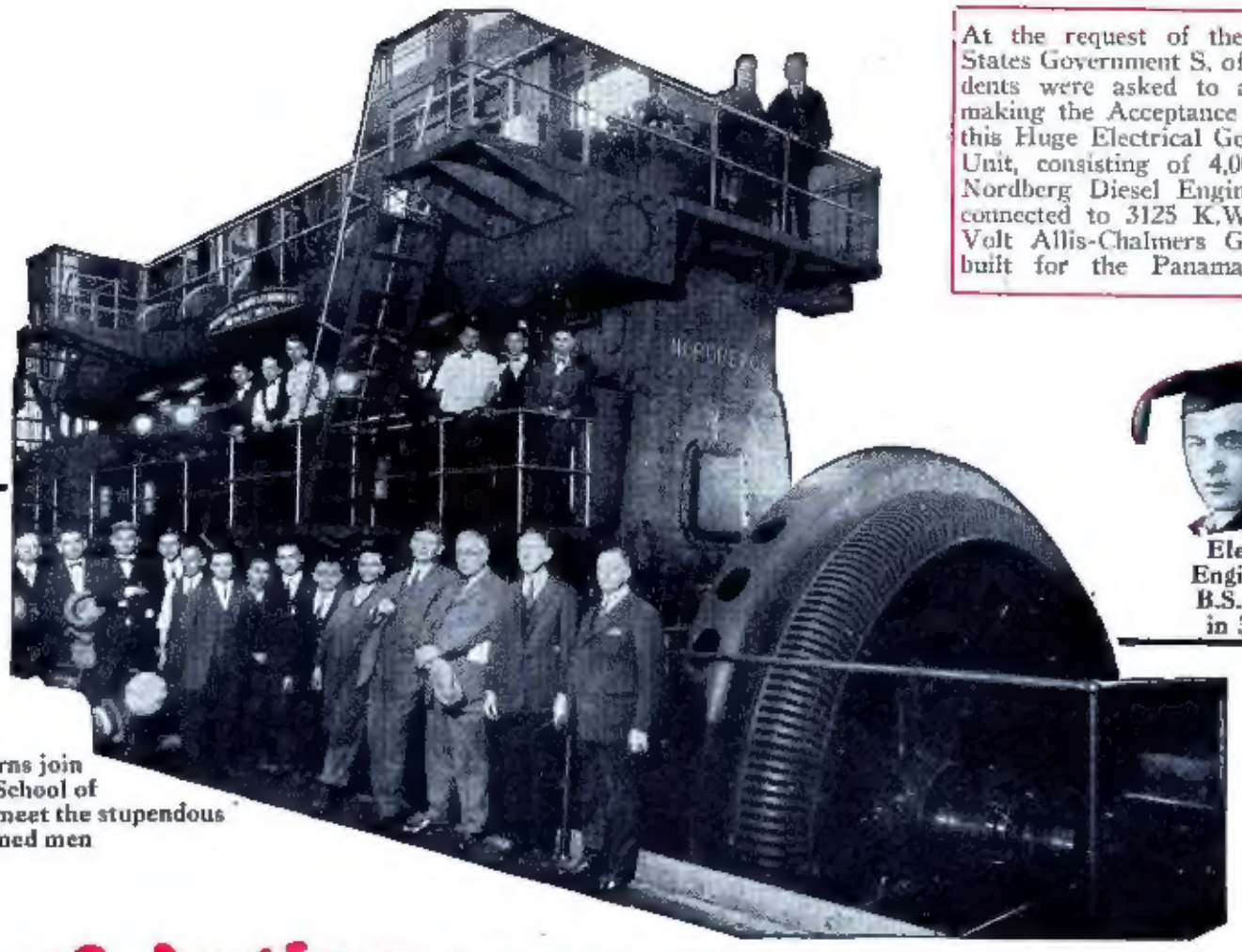
SEE PAGE 677

Science - Aviation Stories by

GEORGE ALLAN ENGLAND EUGENE GEORGE KEY HENRIK DAHL JUVE



At the request of the United States Government S. of E. Students were asked to assist in making the Acceptance Test of this Huge Electrical Generating Unit, consisting of 4,000 H.P. Nordberg Diesel Engine direct connected to 3125 K.W., 2300-Volt Allis-Chalmers Generator built for the Panama Canal.

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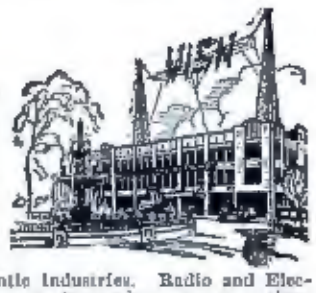

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WOULDN'T it be great if we could buy muscles by the bag—take them home and paste them on our shoulders? Then our rich friends with money to buy them, sure would be socking us all over the lots.

But they don't come that easy, fellows. If you want muscle you have to work for it. That's the reason why the lazy fellow can never hope to be strong. So if you're lazy and don't want to work—you had better quit right here. This talk was never meant for you.

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I've been making big men out of little ones for over fifteen years. I've made pretty near as many strong men as Heinz has made pickles. My system never fails. That's why I guarantee my works to do the trick. That's why they gave me the name of "The Muscle Builder."

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Follow me closely now and I'll tell you a few things I'm going to do for you.

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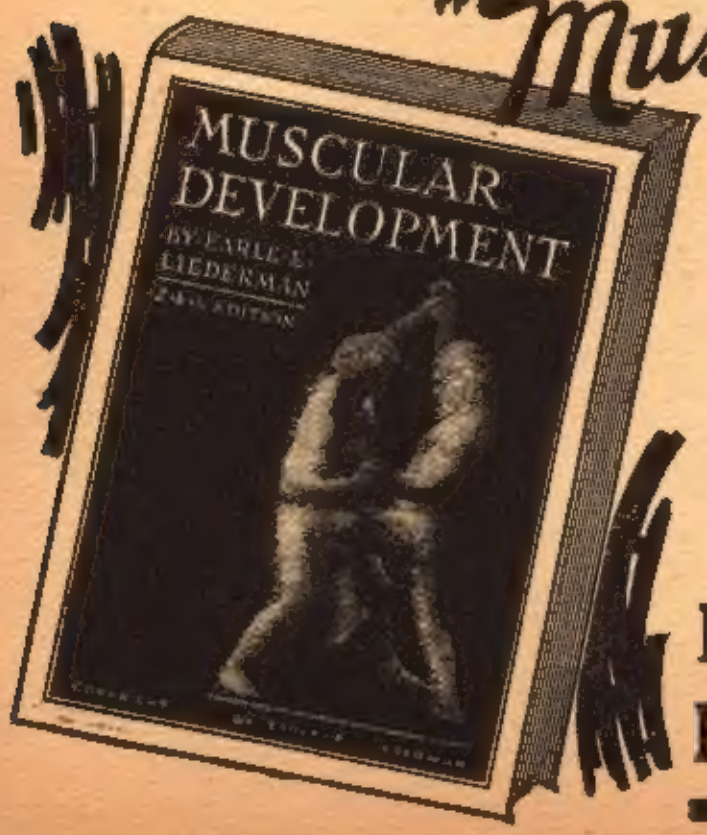
In just 30 days I'm going to increase your arm one full inch. Yes, and add two inches to your chest in the same length of time. But that's nothing. I've only started; get this—I'm going to put knobs of muscles on your shoulders like baseballs. I'm going to deepen your chest so that you will double your lung capacity. Each breath you take will flood every crevice of your pulmonary cavity with oxygen. This will load your blood with red corpuscles, shooting life and vitality throughout your entire system. I'm going to give you arms and legs like pillars. I'm going to work on every inner muscle as well, toning up your liver, your heart, etc. You'll have a snap to your step and a flash to your eye. You'll feel the real pep shooting up and down your old backbone.

You'll stretch out your big brawny arms and crave for a chance to crush everything before you. You'll just bubble over with vim and animation.

Sounds pretty good, what? You can bet your old ukelele it's good. It's wonderful. And don't forget, fellow—I'm not just promising all this—I guarantee it. Well, let's get busy, I want some action—So do you.

EARL LIEDERMAN, the Muscle Builder
Author of "Muscle Building", "Science of Wrestling and Jiu Jitsu", "Secrets of Strength", "Here's Health", "Endurance", Etc.

Send For My New 64 Page Book "Muscular Development"



IT IS FREE

Do you get that? It's free. I don't ask a cent. It's yours with my compliments. Take it and read it. It's the peppiest piece of literature you ever flashed your eyes on. And 48 full-page photos of myself and some of my numerous prize-winning pupils. This is the finest collection of strong men ever assembled into one book—look them over—doctors, lawyers, merchants, mechanics, and every line of trade you can think of. I swear you'll never let this book get out of your hands again. And just think—you're getting it for nothing. Don't hesitate—no strings attached to it. Grab it.

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Volume 1—No. 8 Publication Office, 404 North Wesley Avenue, Mt. Morris, Illinois
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February, 1930
Published by
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On the Cover This Month

is shown the illustration for the prize story contest. Mr. Gernsback was unable to offer any information as to what the strange objects were or where they came from. He thought that the scene took place on another planet, but he would not express certainty about that. We think you will agree, however, that the scene, whatever it is, is an example of Paul's best work.

NEXT MONTH

THE SPACE VISITORS, by Edmond Hamilton. We earth beings may, in more ways than one, be considered as deep-sea fish living at the bottom of an atmospheric ocean one hundred or more miles in depth. We might surely appear that way to beings from another planet, or some strange beings who exist in space. What our relation with these beings might be, Mr. Hamilton shows in one of his marvelous aviation interplanetary stories.

THE RETURN OF THE AIR MASTER, by Edward E. Chappelow. The return of this well-known character will be hailed by readers acquainted with his past exploits in "The Planet's Air Master." In this new and thrilling story, the world is again faced by the Air Master, armed with scientific devices never seen before. It is inevitable that men such as Jolsen should arise. How they are to be controlled is a matter that requires scientific genius, equal to that of the social outlaw. This theme forms the basis for one of the most absorbing aviation stories it has been our pleasure to publish for some time.

A TEST OF AIRPLANE LIGHTNING HAZARDS, by Walter E. Burton. Of all the menaces of aviation, lightning is still one which man has combatted most unsuccessfully. But if aviation is to become as integral a part of our transportation means as are the automobile and train, we must find a means of making our airplanes safe from the bolts that strike from the sky. How this can be done, Mr. Burton shows in a very illuminating article, accompanied by some of the most extraordinary illustrations we have ever seen.

THE FLYING LEGION, by George Allan England. This astounding aviation story of the future is rapidly approaching its climax in this issue. The thrilling adventures of our intrepid Legionaries grow more amazing with each page. They are penetrating right into the heart of a strange mysterious land, combating the magic and science of that land with the Master's own ingenious devices. We are sure our readers will agree that "The Flying Legion" is one of the astounding aviation stories that has as yet been written; and, from the reports we receive, our readers cannot wait out the month to see the succeeding installment.

AND OTHERS.

AIR WONDER STORIES is published on the 10th of the preceding month, 12 numbers per year, subscription price is $2.50 a year in United States and its possessions. In Canada and foreign countries, $3.00 a year. Single copies 25c. Address all communications to Editor, AIR WONDER STORIES, 96-98 Park Place, New York. Publishers are not responsible for lost Mss. Contributions cannot be returned unless authors remit full postage.

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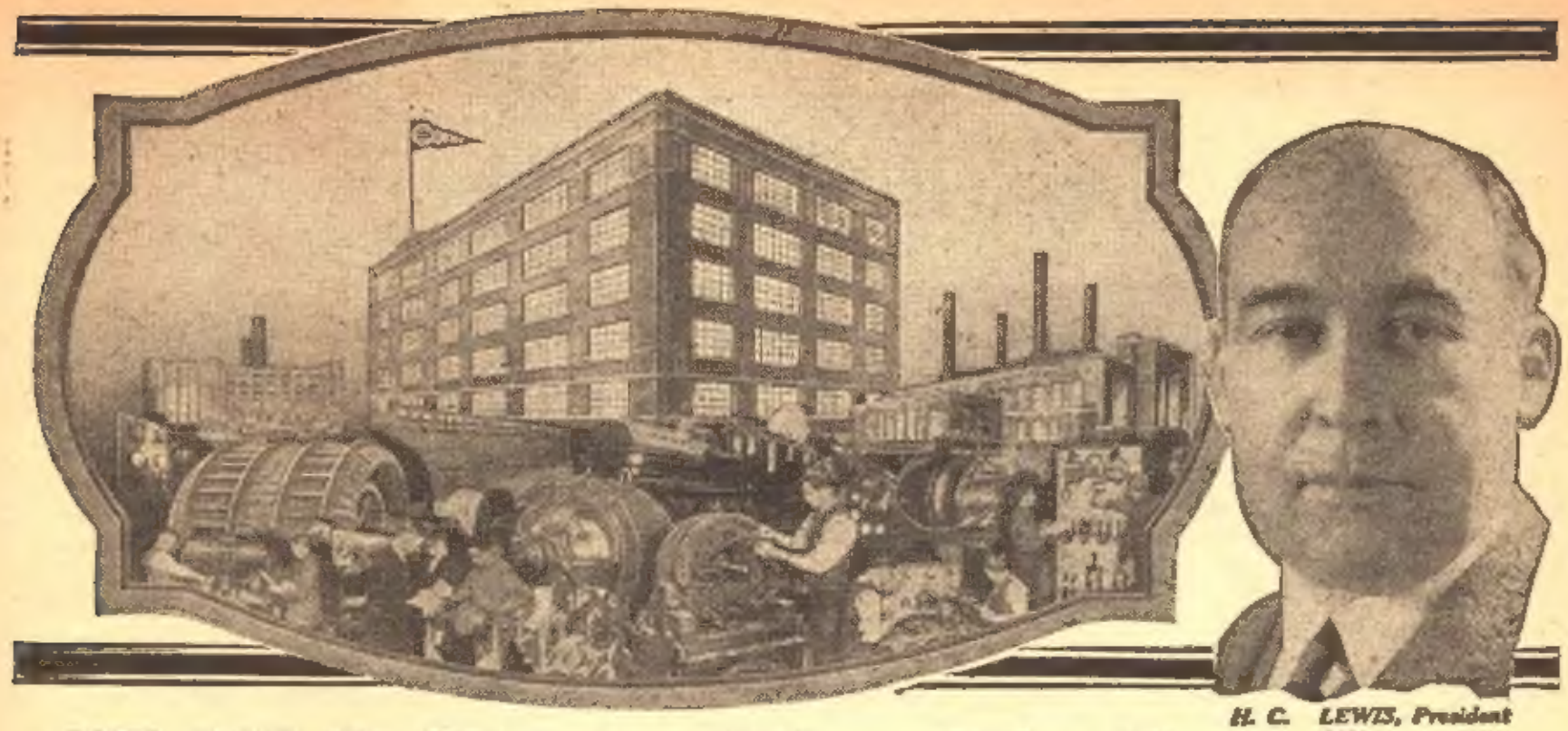

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Lack of Experience Bars No One

I don't care if you can't tell the difference between a battery and an air brake. Any number of students enter my school knowing no more about electricity than an infant. And yet they graduate and go right out in the field and get electrical jobs leading to big pay.

You Don't Have to Have an Advanced Education

That's the beauty of my method of teaching. It isn't what you know—it's how you are taught that counts. My method of teaching enables you to catch on instantly even though you have only had a common school education without the use of dry books. You don't need advanced education to understand electricity the way I teach it. Just think—you can learn in 90 days. Don't let lack of advanced education worry you.

I Don't Care If You Are 16 Years Old or 40

Electricity gives everybody the same wonderful opportunity. Don't worry about your age. Plenty of men who never succeeded until late in life. This may be just the field you were cut out for. No matter what your age is, or how long it has been since you studied, my method of teaching will prove fascinating and easy to you.

Earn While You Learn

We maintain a real employment service. If you should need part time work, I'll assist you in getting it. If you will just write and tell me your circumstances. In that way many earn while learning. Many of my students pay all their living expenses through part time jobs secured by Coyne.

Don't Worry About a Job

Coyne training settles the job question for life. Clyde F. Hart got a position as electrician with the Great Western Railroad at over $100.00 a week two weeks after graduation. That's not unusual. We can point to Coyne men making up to $600 a month. Coyne men get positions which lead to salaries of $50.00, $60.00 and up a week. You can go into radio, battery or automotive electrical business for yourself and make from $3000 a year up.

No Books—No Lessons

You work on real live electrical machinery, building real batteries, winding real armatures, operating real motors, dynamos and generators, wiring real houses, etc., etc.—here in this world famous parent school, with its hundreds of thousands of dollars worth of new up-to-date electrical equipment.

Prepare for Jobs Like These—

Coyne men have the advantages of getting positions which lead to those that are listed below. Our free employment bureau gives you lifetime employment service.

Armature Expert—$50 a Week and up.
Substation Operator—$65 a Week. Inventor—Unlimited.
Auto Electrician—$60 a Week and up.
Maintenance Engineer—$60 a Week and up.
Service Station Owner—$60 a Week and up.
Radio Expert—$60 a Week and up.

New $2,000,000 School

We are now in our new, fireproof, modern home wherein is installed thousands of dollars worth of the newest and most modern electrical equipment of all kinds. We now have a larger amount of floor space devoted to the exclusive teaching of practical electricity. Every comfort and convenience has been arranged to make you happy and contented during your training.

Electricity the Greatest of All Industries

Electricity is THE FIELD. It is one of the youngest. Every day sees an increase in its use. It holds the greatest future. The young man of today who gets into Electricity lays the cornerstone for lasting success—prosperity. Nearly every large building now needs trained Electrical men for maintenance. Every hotel, theatre, station—in fact Practical men are in demand everywhere—all the time.

Thorough Training that Results in Big Pay

My training is so thorough that you will be able to step out and get a job leading to big pay. Hundreds of Coyne graduates testify as to the thoroughness of my course and that if it hadn't been for this thoroughness, they never would have been able to have held their jobs. It's the wonderful, practical, learn-by-doing method which gives Coyne students such a thorough training.

Fascinating Method of Learning

Maybe you don't think this method of training isn't fascinating. The instructor shows you how to do job No. 1. Then you do it. Then he shows you how to do job No. 2. Then you do it. After while you're building real batteries that generate real juice; you wind real armatures that actually work and you do complete house wiring jobs. And all this time you'll find that it's so interesting you won't even realize that you are in school.

Lifetime Employment Service

My lifetime employment service not only helps you after you graduate, but from then on, throughout life, you are always welcome to call upon us for further employment service.

Every Possible Kind of Assistance

My organization is so thorough that you get every possible kind of assistance. We secure a clean room for you at the lowest rates. The welfare department looks after your comfort. We help you to get part time employment. We give entertainments for you. We help you to get a job when you graduate. We keep in touch with you, giving you the advantage of our entire staff should you run across knotty problems and need assistance.

My Big Book FREE!

Coyne is your one great chance to get into electricity. Every obstacle is removed. This school is 30 years old—Coyne training is tested—proven beyond all doubt—endorsed by many large electrical concerns. You can find out everything absolutely free. Simply mail the coupon and let me send you the big, free Coyne book of 150 photographs . . . facts . . . jobs . . . salaries . . . opportunities. Tells you how many earn expenses while training and how we assist our graduates in the field. This does not obligate you. So act at once. Just mail coupon.

My Course Includes Training In *Airplane-Electricity*

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You Can Easily Learn Radio at Home Through This Course Sponsored by the Radio Corporation of America

RCA sets the standards for the entire radio industry ... And this RCA Radio Institutes' Home Laboratory Training Course gives you the *real inside secrets* of radio *quickly* and *easily!* In your spare time, you can obtain all the information you require to make a success in radio. You study at the very source of all the latest, up-to-the-minute developments. This is the only radio course sponsored by RCA, the world's largest radio organization. This is the *real way* to study radio. Learn radio under the direction of RCA ... under the men who actually made radio what it is today!

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Newark, N. J.	560 Broad Street

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VOLUME 1
No. 8

AIR WONDER STORIES

FEBRUARY
1930

The Future of Aviation Springs from the Imagination

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Dept. Mechanical Engineering, University of California

These aeronautical experts pass upon the scientific principles of all stories

$300.00 PRIZE STORY CONTEST

By HUGO GERNSBACK

SINCE the establishment of AIR WONDER STORIES, we have been in receipt of many letters asking whether it is a policy of this magazine to accept stories from new authors. Many of the writers seem to have acquired a notion that only certain authors may contribute to this magazine.

This impression is, of course, entirely erroneous; for the editors are always happy to publish the stories of new and promising writers.

In order to stimulate authorship, and turn the undeveloped talent among the general readers of this magazine to writing, AIR WONDER STORIES has decided to inaugurate a prize story contest—the first this magazine has conducted.

Of late there has been a very strong demand from our readers for aviation stories of the interplanetary type; that is, stories which have their locale on not only our own earth, but also in other worlds.

Heeding this request, as we heed every impressive request from our readers, we are launching ourselves with vigor into the publication of interplanetary flying stories.

The front cover of this month's issue reflects this policy. It is, frankly, a scene laid on a distant world.

Just what the story is, I do not know, even though I originated the idea of the illustration. And, although it has been executed by the masterful brush of our own artist, Paul, he also is ignorant of its ultimate meaning.

What it is all about, therefore, we leave entirely up to you; and we are certain that many of our readers will be able to tell all of us exactly what happened on that far-distant world.

The present contest, then, is centered around this month's cover illustration. I can give you no further clues as to what the picture is all about, except what I have already said. You will have to use your own ingenuity in writing a plausible and convincing story around it. The picture speaks for itself.

You are asked, then, to write a story around the cover illustration; and, the more interesting, the more exciting, and the more scientifically probable you make it, the higher will be your rating when the prize winners are selected.

Remember that anyone can participate in this contest. You do not have to be a polished or experienced author; but, as a friendly word of advice, if you have never written a story, it would be well to submit it to a literary friend or teacher before you enter it in the competition.

Study the details of the cover illustration carefully; AND BE SURE THAT YOU DO NOT MISS ANY OF THE DETAILS, BECAUSE THEY ARE ALL IMPORTANT.

In a contest of this kind it is, naturally, impossible to have a great many prizes. For this reason, there are only four, to be awarded to the writers of the four best stories submitted. Each of these prize-winning stories, we know, will be a treat for our readers. The reason is that authors of imagination will naturally have entirely different plots and different ideas as to what the cover illustration represents.

But before you start writing, be sure to read the following rules carefully.

(1) A short science-aviation-fiction story is to be written around the cover picture of the February 1930 issue of AIR WONDER STORIES.

(2) The story *must be* of the science-aviation-fiction type. It should be plausible in the light of our present knowledge of aviation and science.

(3) The story must be between 5,000 and 8,000 words.

(4) All stories must be submitted typewritten, double-spaced; or *legibly* penned, with spaces between lines. Pencilled matter cannot be considered. Stories must be received flat, not rolled.

(5) No manuscripts will be returned unless full return postage is enclosed.

(6) Because of the large number of manuscripts expected, the editors cannot enter into correspondence on stories submitted.

(7) In awarding the prizes, AIR WONDER STORIES acquires full rights of all kinds; such as translation into foreign languages, syndicate rights, motion-picture rights, etc. The Board of Editors will be the sole judges as to the winners.

(8) Stories in addition to the prize-winning ones may be chosen by the editors, at their option, for publication at the usual space rates of this magazine.

(9) The contest closes on March 5, 1930, at noon, at which time all manuscripts must have been received at this office.

(10) Any one except employees of the Stellar Publishing Corporation and their families may join this prize contest. It is not necessary to be a subscriber to the magazine.

$300.00 IN PRIZES

These cash prizes will be awarded and will be paid on publication of the prize-winning stories in AIR WONDER STORIES.

First Prize	$150.00 in gold
Second Prize	75.00 in gold
Third Prize	50.00 in gold
Fourth Prize	25.00 in gold

All prize-winning stories will be published in subsequent issues of AIR WONDER STORIES in the order of their rating, as determined by the judges.

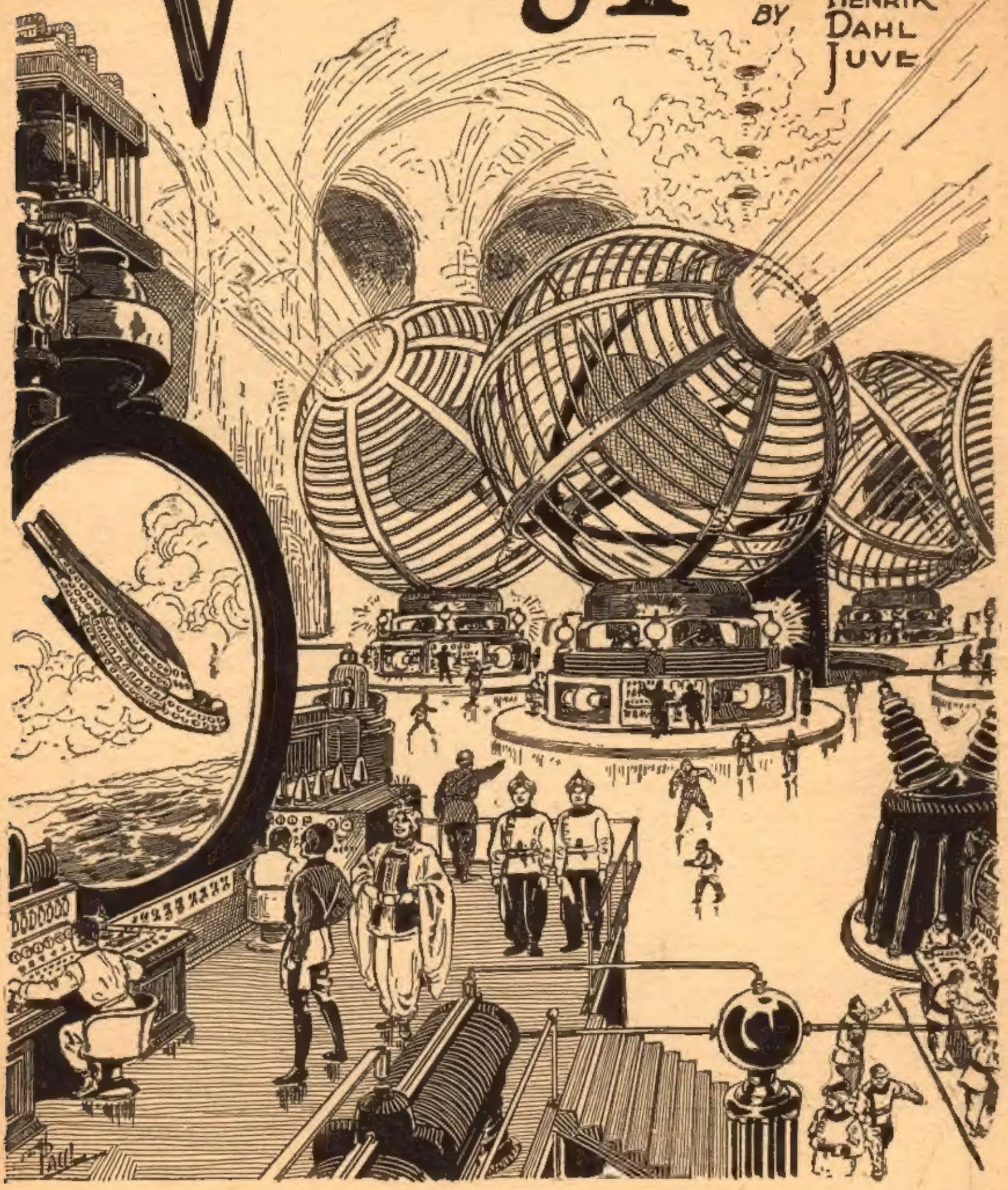
IMPORTANT

For the guidance of new authors, we have prepared a pamphlet entitled, "Suggestions to Authors." This will be sent to applicants upon receipt of 5c. to cover postage.

All manuscripts must be addressed to Editor, Prize Cover Contest, AIR WONDER STORIES, 96-98 Park Place, New York.

The Vanishing Fleet

BY HENRIK DAHL JUVE



(*Illustration by Paul*)

There was loud buzzing sound from a quenched-spark gap, the globes emitted a brush of violet light that crackled, and the air was heavy with ozone. On the televisor, a great air-liner foundered down to the surface of the water.

THE VANISHING FLEET

IN the underground office of the military secret service, sixteen captains sat around a table littered with reports and a variety of other documents. The room was some twenty by fifty feet, and its walls and ceiling glittered with crystals of a thousand shapes and hues, indicating that the place had been excavated by means of a molecule-disruptor. The single, little, cold-light apparatus that illuminated the room, as if by sunshine, hung from the high ceiling.

The admiral of this flying squadron, sitting at the head of the table, straightened himself slightly and the captains looked to him expectantly; for they saw the indications of a decisive statement.

"We have investigated," he began, "but for all that we have run down—one idea after another—we are just as much in the dark as ever; perhaps more so. Thirty-seven trans-Pacific freight and passenger airships have disappeared like shadows in the dark and we haven't a single clue. We sent out the *G7* and *G9* and they vanished without leaving a trace. To be sure, the *G13* and *G20* are still out scouting; but they are looking for something of which they know neither the nature nor the locality. If they discover anything, it will be purely by accident. And the world is rather large when one is searching for something that he cannot describe, or imagine, or give even an approximate location of. And I'll be confidential with you; the Department in Washington is frantic and has sent us what we may, without straining the imagination, regard as an ultimatum. They are stumped themselves, and know it; so to save themselves they have begged the question by passing the responsibility down to us. And now they are riding us to take this mystery apart and expose the trick, or whatever it is."

The admiral paused gravely:

"Four chairs are vacant at this table. We may never see two of our members again, nor the four hundred men composing their crews. And the other two are in constant danger, if we are to judge from past experience. It seems we cannot pass the responsibility any farther down the line. We shall have to assume that we ourselves must get to the bottom of the mystery. We are always prone to wander into elaborate theories when confronted by some mysterious problem; but when the concealed machinery is brought to light we are usually amazed at its simplicity. In this case, therefore, let us try to simplify our thinking and expect a simple solution.

"Captain Gauthier, you have been working on a new idea concerning the nullification of gravity. Have you made any progress?"

Captain Burke Gauthier rose and was about to report when there was a knock at the door. The admiral ordered the man without to enter. An orderly opened the door and saluted.

"The radio operator reports, sir, that the television and radio connection with the *G20* was suddenly broken and that he is unable to get in touch with them again. The televisor went dead suddenly without the slightest clue."

The room was silent a moment; one could have heard a pin drop.

"Did the captain of the *G20* have time to make any remark before communication was interrupted?" asked the admiral.

"No, sir. The operator thinks that the pilot of the ship jumped and slammed on his emergency control just as the connection was severed; but he can not be sure, for it all seemed to happen simultaneously."

"What was her location just before she disappeared?"

"It was ten minutes after she gave her last location that she disappeared. That was reported as 132° East and 24° 7′ North; so they must have disappeared within a radius of two hundred miles of that location, and in the vicinity of the Volcanic Islands."

"Hum," the admiral reflected aloud: "That narrows it down somewhat. Has the *G13* been told of the fate of the *G20*?"

"Yes sir. She is on the way to the scene now."

"Tell them to proceed carefully; and perhaps they can learn something."

"Yes, sir." The orderly saluted and withdrew.

HENRIK DAHL JUVE

IN this story, our author relates further exploits of his delightful characters, Captain Gauthier and Lieutenant Evenrude, those daring aviators of the future. He gives us a new insight into some of the conditions that are likely to prevail in the future when traffic through the air becomes as common as traffic through water and over land is to-day—when, in fact, all means of transportation except by air will be antiquated.

In such a day, one marked by great scientific developments, there will be struggles for control of the air, between forces using the latest scientific devices. Just as to-day we have in prospect aircraft which can be flown without a single person being in it, so, in the future, devices will undoubtedly be invented to bring down aircraft against the will of the pilot.

When such things happen, times will be more exciting than they are to-day; for there will be gigantic battles between the brains and the resources of law and order and those of the super-criminals against which they are pitted. Such a condition Mr. Juve portrays very vividly in his present story.

A Deep Mystery

FOR a time there was silence in the council chamber. The admiral was the first to break the stillness.

"Now, Captain Gauthier, we are ready to listen to your report."

The captain was startled out of the horrid thoughts that filled his mind.

"I ran the last of the mathematical problems through the computing machine last night. I imagine that you could follow the idea better in figures, and check me on the plausibility of my idea more easily if I were to explain verbally."

The captain picked up a small bound volume from the table before him, and his companions passed it along to the admiral, who opened the little book and began to read. As he progressed he appeared to become more

and more interested until he was oblivious of the presence of those about him. Five minutes stretched out into ten, and the admiral reached absently for his pencil. He found he had mislaid it, and asked one of the captains nearest him for one. The distraction seemed to make him aware of their presence, and he dismissed the meeting abruptly. The captains left him to his perusal of the mathematics, and scattered to offices, ships and living quarters.

Captain Gauthier passed through the underground arsenal to the hangar room, where rested the remaining sixteen ships of the squadron. The vast cavern was silent and almost deserted, except for a crew of ground mechanics far in the distance. Without calling for a motor car, of the type used to carry men through the great room, the captain strolled down the sidewalk to the battleship *G2*, of which he was commander. So accustomed was he to large ships that he was indifferent to the great bulk of the war vessel. It was only five hundred feet long and about fifty feet in diameter—much smaller than the passenger liners in commercial use. He walked the eighty yards to the center of the monster, and ascended a flight of steps to the elevator room. The elevator took him to the third deck, and he walked down the corridor to the control room.

Lieutenant Evenrude, his second in command, greeted him with a cheerful salute.

"Did you learn anything new at the meeting?"

"Nothing!" The captain slumped into a chair that was bolted to the carpet-covered steel floor. "All that we learned for certain is that we have now lost communication with the *G20;* and she is probably lost—like the rest of the ships that have disappeared."

"It certainly is a mystery. What do you suppose is going on?"

"I haven't the least idea. We'll probably find out some day; but in the meantime we are losing ships. What worries me is that Bernadine is in the Orient and will be coming home on the Shanghai-San Francisco limited. It flies over a route that is near the place where the ships are disappearing."

"You better radio her to come home by way of Europe. There's no telling what is becoming of all those ships and the people on them."

"I have thought of that; but there will be several days before she is to start. So there is plenty of time. And before then we may have solved the mystery."

The conversation lagged and the captain fell into a reverie that carried his thoughts back to his invention. He wondered if it might not be a factor in solving the mystery. Perhaps this new method of nullifying gravity would defy the mysterious force that was causing ships equipped with the old-time nullifiers to vanish. He jerked himself out of his idle reflections and hurried back to the council chamber; where he found the admiral reading for the second time the theoretical details of the new nullifier, and carefully checking the formulas on a computing machine which had been brought into the council room.

The admiral looked up from his work and greeted Captain Gauthier enthusiastically:

"I have just gone over your theories carefully, and have found no mistakes. It is a remarkable piece of work, and will revolutionize air transportation—if it works out in practice."

He touched a button and presently the chief engineer, in charge of construction and repair operations, presented himself. The admiral handed him Gauthier's little volume, and instructed him to begin work on a model immediately.

"If necessary," he continued, "pull all of your men off whatever jobs they are doing now to rush this model out. I suggest that you install the apparatus in one of the staff ships for a trial. You may use my reserve flag ship, the *GA,* since the other is in good shape now. Put all of the designers we have on the job immediately, and put a crew on the staff ship to take out the old nullifier. What we want is speed, and lots of it."

The chief engineer saluted and withdrew.

"Trust that man to do the almost impossible," the admiral remarked: "We shall soon have a trial flight and we will be unaware of the problems he has overcome and the real efficiency and speed with which he has worked."

CHAPTER II
Another Disappearance

THAT afternoon, at two o'clock, the captains were again assembled in the council chamber to discuss their problems. The admiral appeared very grave:

"I received, but a short time ago, some of the most disconcerting reports imaginable. The *G13,* as you know, flew to the aid of the *G20.* She was on the sixty-mile altitude level, and under full speed, when she struck a peculiar gravitational zone, at about three degrees east of the spot where the *G20* was last heard from. Her momentum carried her through; for it appeared that she had merely sliced through the outer edge of the circle or cylinder, or whatever the form of this zone is. Captain Lang reported that, whatever the influence was, it paralyzed her nullifiers and withdrew the potential energy from the *G13* faster than a free fall by gravity could. She did fall for a considerable distance before she emerged from the zone and he was again able to control the ship. He sent in a lengthy report to the effect that there seemed to be no physical effect upon the men during the fall; since they were falling freely and the change from no-gravitation to a freely-falling mass is not great. But, when they emerged from the dangerous zone, they were acted upon immediately by a levitative force and some were rendered unconscious by the sudden change. It seems that the pilot had the elevators and potential-energy receiver wide open in a vain attempt to fight against the paralyzing influence.

"Lang further reported that he was going to the other side of the cylinder or zone, and trying to ascertain its boundaries. He gave his position every minute until communication was suddenly interrupted. We haven't heard from him since. That makes four cruisers gone."

There was silence for a full minute. Presently, one of the captains ventured a suggestion.

"Perhaps," he said, "if all passenger and freight ships are ordered to keep safely away from this zone, there will be no more losses until the mystery is solved."

"That has already been done. All transoceanic ships that fly regularly near the Volcanic Islands are being re-routed and will give the place a wide berth. We have suggested that they are not to approach within five hundred miles of the islands, which should keep them clear by a wide margin."

"Suppose, sir," another captain suggested, "a ship were to fly over a safe distance, and then dive under water and approach the islands in that way? Perhaps they could land and investigate."

"I had thought of that; but, from the report sent in by the *G13* after her first experience, it appears that

their energy receiver, radio and television receivers and transmitters, all ceased to function. I am inclined to believe that the same thing might happen under water and we would lose another ship. I'll admit that I am in a quandary."

"I volunteer to take a small ship and go alone to test the possibility of approach under water," Captain Gauthier offered.

The idea had not occurred to the others; but all at once volunteered.

"No," the admiral refused: "We cannot afford to lose the captain of another ship; but the idea is a good one and I shall explain the mission to the crews and ask for volunteers. You, Captain Gauthier, will assemble the juniors and their crews, and tell them of the plan; then call for one lieutenant to pilot a small ship and enlisted men to operate the motors, radio and television. I shall leave it to you to select the men."

The captain saluted and left the room. He proceeded directly to the hangar chamber, where he touched a button, sounding the general assembly call for junior officers. In a very short time, they were assembled in the conference room while Gauthier told them of the trouble and the purpose of their call for volunteers. As one man they stepped forward. Gauthier was puzzled as to a choice.

"Each volunteer will write his name on a slip of paper."

Slips of paper of uniform size were distributed and the officers signed their names. These slips were then gathered in a cap and shuffled. Three of the officers were asked to draw; the third name read to be that of the one to pilot the little ship of fate. A hush fell upon the room as the names were read slowly. Two were read, and then the one selected to go would be announced. "Lieutenant Evenrude" the committee read.

The captain caught his breath. His own first officer and personal friend!

"Lieutenant Evenrude, you will select, by whatever method you choose, the enginemen and radio operators from among the volunteers and report to the council chamber immediately."

Gauthier Is Restless

CAPTAIN GAUTHIER left the assemblage in charge of Evenrude and hurried back to report to the admiral.

When the final arrangements were completed, it was a tense group that watched Evenrude and his operators enter the little fifty-foot ship. Gauthier wrung his friend's hand, not knowing whether or not this was their last meeting. The little ship ascended through the roof of the take-off chamber, oriented itself, and dashed in the direction of the zone of danger. It soon dwindled to a mere speck in the distance.

For a time Gauthier stood looking after the vanishing ship. A curiosity to know more about the phenomenon came over him and he wished that he too were in the ship of adventure and discovery. It was as though another Columbus were starting out into the unknown. Presently he drew himself out of his reverie and wandered down into the drafting rooms of the laboratory. Here he found over a hundred men at work. There were mathematicians and engineers and mechanics interpreting with mechanical ideas and machinery the mathematics of his theory. As fast as the ideas were evolved, they were given to the designers, who began making drawings and arranging the details of construction. The drawings were no sooner completed than they were sent to the shops where machines were set up to make the parts. In another room a crew of mechanics were at work taking the old nullifying equipment out of the admiral's reserve flagship, the *GA*.

Captain Gauthier was restless. He went to his own cabin on board the *G2* and tried to read. He flung the book aside when he realized that he was only looking at meaningless words. He began to pace the floor, like a caged animal that longed to run or fly. Restless, he turned on his radio and televisor and tuned in the transmitters aboard the little ship in which Evenrude was riding into the unknown. He could see the lieutenant bending over his controls, and the receiving television screen was tuned in to the squadron headquarters apparatus. By looking at the image of Evenrude's screen he could even see the headquarters operator who was, in fact, sitting at his apparatus in a room adjoining the hangar space in which the *G2* now rested.

Gauthier waited until he saw that the two were not busy conversing and dialed a number on his radio telephone. He saw Evenrude tell the operator to change the wavelength of his receivers, and watched the lieutenant as he lifted the phone.

"Lieutenant Evenrude talking."

"This is Burke," the captain answered: "Cut your televisor over on my wave, if you aren't too busy with the staff operator."

"Right. We're not very busy now; but I can't stay long, you know."

The captain saw and heard Evenrude give the order to his operator and watched the screen in the lieutenant's ship as it was being tuned. Several meaningless patterns flew across it, as the operator hunted for the captain's wave. Presently Gauthier saw an image of himself on the distant screen.

"What is your position now?" he asked.

"We're just leaving the coast. We have averaged about 1200 miles an hour. Not so bad for this little shell. But what's the matter with you, old man? You look as though you'd lost your best friend."

"I'm not sure whether I have or not." The captain tried to grin: "But I wish I were along. I hate to stick around here doing nothing but waiting for news."

"I know it's tough. I'm glad that I drew the lucky number; but when I wonder what is ahead I get a creepy feeling. I'll bet if a fellow tried to fly to Mars or to the moon, and didn't know but that he'd have to live there the rest of his life, he'd have about the feeling that I have. It is interesting, and yet it's something to think about."

"Well, we'll be along in a few days if my nullifier works out. But I wish that I could have gone with you."

"I wish that you were along. But I'll have to cut over on the headquarters wave and report. We'll soon be testing the underwater theory; so I have to keep in touch with headquarters. So long."

The captain saw his own image on the screen in the little ship of adventure vanish, and that of the headquarters operator appear. For a time he watched Evenrude busy himself over his charts and controls; and then shut off the televisor. During the activity Gauthier had lost his restlessness; but now it returned with increased force, and he paced the floor, unable to settle down to any line of thought. Presently he went to the drafting room and asked if he might help them for a while. He was instantly added to the group of mathematicians who were interpreting his work, and did much to hasten the progress of the invention. It

was late in the evening when he was called to the council room by an orderly.

In the chamber, he found gathered again all of the remaining captains. The admiral was shuffling through a pile of papers and did not look up to meet Gauthier's eye. He cleared his throat as though to speak; then paused for a long time while the others waited apprehensively. Eventually the admiral recovered his poise and spoke slowly without looking up.

"We have been in touch with Lieutenant Evenrude up to a few minutes ago. He dived into the ocean about three hundred miles this side of the Volcanic Islands and proceeded without mishap until he was within two miles of the principal island—then radio communication was suddenly blocked. That is the last we have heard of him. That's all."

CHAPTER III
Leave Granted

THE captains filed slowly and silently from the room. Gauthier alone remained. He approached the head of the table.

"Sir, may I take my ship out and look for Lieutenant Evenrude?"

"I am sorry, but we can't afford to risk another battleship and the lives of two hundred more men in a quest that experience has taught us is futile. Until we can understand the phenomenon and make preparations to combat it we shall have to leave it alone. I know just how you feel; but you can understand why I must answer emphatically, NO!"

The captain straightened, saluted and walked stiffly out of the room. Once, out of the admiral's sight he strode miserably to his ship and locked himself in his cabin. Whether he slept that night or not the captain did not know. It was about eight o'clock the next morning when the nightmare tossing about on his bunk was broken by the soft ringing of his telephone bell.

"Captain Gauthier," he said.

"This is Bernadine. Won't you turn on your televisor so that I can see you?"

The captain made the necessary adjustments and the face of Bernadine appeared before him. Her wavy blond hair made her prettier than ever, and her blue eyes were shining with anticipation. He noticed that her face had tanned considerably. It seemed to Gauthier that her smile drove all the gloom from his cabin.

"I have changed my sailing date and am coming home on the Manila-San Francisco limited. It is No. 32, and arrives in San Francisco at 2:27 tomorrow morning. Are you going to be at the terminal to meet me?"

"I'll do the best I can to get leave. We are in a mess here and it may take some persuasion to get a few hours' leave. But I wish that you'd come by way of Europe, instead of crossing the Pacific. I'm worried about you."

"The manager here told me that they have changed their route and the ships are having no trouble at all. He says that there is no danger. They have been going through every hour; so I don't see any reason for going the long way."

"I'll go and see the admiral right away and let you know."

"I'll be waiting for a call from you, number 37G10, Manila."

They chatted for a few moments more, and then hung up. The captain hurried to the private office of the admiral, and was admitted without delay.

"May I have a leave of absence for a few hours?" he asked his superior after the formalities were over.

"That must depend upon the nature of the errand. If it is something very important it might be arranged; although you realize the difficulty at this particular time."

"I wish to meet the Manila-San Francisco limited at 2:27 tomorrow morning."

The admiral winked. "I see. A very important engagement with a double meaning. Is she pretty?"

Gauthier smiled: "Prettiest in the world. And I can't help but worry about her, with this thing going on."

The admiral reflected for a moment: "Now that Evenrude has gone, I am inclined to let you go for a day or two. It might snap you out of this disturbed state I have noticed. You may leave this evening in time to make connections with the limited. When you arrive in San Francisco you will call this office and let me know just how I can reach you at once in any emergency."

Gauthier thanked his superior and departed. For the rest of the day he tried to interest himself in various occupations, but could not. At last the hour came for him to take the New York-San Francisco express. He felt relieved that the time for activity had come. He flew the short distance to New York in one of the smaller staff ships, and boarded the liner which departed at 12:30 in the morning. After a trip of two and a half hours, he stepped from her upon the terminal platform in San Francisco (at midnight, Pacific time), and immediately communicated with the squadron's headquarters by transcontinental radiophone.

Gauthier went from the telephone booth to a waiting room; and finally to the upper landing deck of the terminal, where he paced the platform restlessly as he waited for the 2:27. He drew his waterproof coat more closely about him; for the November chill was penetrating, and a dense fog had blown in and put its clammy grip upon the city. At one end of the promenade, he paused and, in the eerie red light of a neon beacon that marked one corner of the deck, looked at his watch. Only five minutes more. He leaned against the railing that bounded the platform and gazed absently down at the monster landing space. Two thousand feet away, in the vague distance, he could see the two red smudges that were the corner markers at the other end of the deck. A thousand feet to his right was the fourth beacon, showing the other corner.

Through the fog, it seemed as though the searchlights which were the source of the light had become obscured or lost; and that the fog itself was emitting the light—towers of red mist that reached upward and lost themselves in the dizzy heights. Everything was faintly illuminated by a ghastly red light. There were white lights scattered here and there, but they trailed it, soft and ghostly, until they were lost in the distance.

Forebodings

A MERE fog in San Francisco is nothing worth mentioning; but this one was different. At least, it seemed different to the captain; for a chilly foreboding arose within him and matched the chill from without. Things seemed vague, unfamiliar, uncanny, suffocating, terrifying.

A mechanic loomed out of the obscurity from somewhere, but whence, the captain had no means of knowing. He passed so close that Gauthier thought him almost solid and tangible and yet his outline was soft, and vague. He nodded solemnly to the officer, faded

again into nothingness, vanishing in the reddish gloom. Two men approached each other from nowhere and conversed for a few minutes; presently they parted and also vanished in the depths of fog. Gauthier wondered if these men had met for the first time, and could they ever find each other again?

A red pillar of light appeared above him from the north; it swung around and approached the terminal from the east. Gauthier leaned over the rail to watch the ghostly thousand-foot shape slide silently into a lower landing deck. He saw the number, and knew that it was from Alaska. He imagined that it was now disgorging its hundreds of passengers and that they were melting into the gloom.

Again he glanced at his watch. It was now seven minutes past the time for the arrival of the liner. The fog became thicker, chillier and gloomier than ever. It seemed to penetrate his very being, and he felt a sickening wave of dread sweep through him. Seven minutes overdue. For a liner to miss its schedule by so much meant trouble. And trouble, at this time, signified only one thing to the captain.

He descended in the elevator to the second floor and went to the company's radio booth and dispatching room to inquire concerning the trouble with the limited. He felt apprehensive about the fate of the ship; yet was queerly reluctant, to learn the truth. Squaring his shoulders, however, he walked up to the desk and put this question. The official recognized his uniform and insignia, and answered frankly:

"We have been out of communication with the ship for some time and are afraid that she, too, has been swallowed up in the 'zone.' We have been trying desperately to get in touch with her, but she is simply gone. Several aerial tugs are out looking for her."

"But I thought that her course was changed to avoid the islands. I believe that the company has orders from the Air Department to that effect."

"Yes, sir, the route was changed; but she seems to have vanished like the others. We are trying to keep it quiet until the tugs report."

They theorized for a time and came to the conclusion that the zone of danger had moved. Gauthier was about to leave when a messenger came out of the operator's room and handed the official a note. He read it and passed it to the captain.

"So one of your tugs has vanished!" The captain looked up from the sheet of paper: "Do you know where it was at about the time you lost communication with her?"

"Wait a moment and I'll find out."

The clerk went into the operator's room and while he was gone Gauthier paced restlessly. Suddenly a wild idea formed in his mind and he stopped suddenly. His restlessness was gone and he became a man of purpose and determination.

The clerk returned and stared at Gauthier. For a moment only did he wonder what had gone on in the captain's mind. Then he handed Gauthier a slip of paper on which was written the location last sent by the tug before she disappeared. The captain compared this with a large map on the wall and found that it was in the vicinity of the island of Taiwan.

"Now can you give me a copy of the limited's route charts and flying orders, and her approximate location just before she disappeared?" His tone suggested a command rather than a request.

"She disappeared somewhere near the island of Taiwan; but her flying orders and route are confidential. What are you going to do?"

"I'm going out there and see what the trouble is if I have to fly alone," said the captain: "Confidential or not confidential, I want those charts. I'll get them sooner or later anyway; but I want them now. Here is my card."

The official glanced at the card and whistled. He had heard of Captain Burke Gauthier before and knew that he was attached to the secret battle squadron. He realized that the captain's statement was true; that he would learn all about the course of the liner by merely looking into the headquarters files. He turned to a filing cabinet, and after a little search drew an envelope partly from the drawer. He paused and a look of doubt crossed his face. Perhaps this man might not be as he represented.

"These papers are really confidential, and I have orders not to show them to anyone," he hesitated.

CHAPTER IV
Gauthier Breaks Away

GAUTHIER was desperate. He let himself through the gate and behind the counter. The official looked up startled, realizing the menace in the captain's eyes. He reached for his pocket disruptor but, before he could draw the weapon, Gauthier swung a vicious right to his chin. Without stopping to see what had happened to him, the captain seized the envelope of charts and darted from the room, down the stairs, and out into the street. It was now raining and he was glad that he had on his warm waterproof. He stopped at a radiophone booth and called the admiral.

"I should like an extension of my leave. The limited has vanished, and I am going out to see what I can find!"

"You had better wait until we have that new nullifier built and tested," the admiral said. "We may be able to get through with it. I promise that the first ship to be equipped shall be yours and that you may go as soon as it is ready. That will be in a few days."

"But, sir! Bernadine was on board that ship and she may be in danger—if she is not dead. Do you think that, under the circumstances, you would hesitate to hand in your own resignation?"

"We can't let you go on such a wild-goose chase now. That must be final."

"Then you may regard this as my resignation—and that too is final. Good-bye."

Gauthier watched the screen and saw the admiral's face redden with anger; but he did not wait for the reply. Breaking the connection, he ran out into the street and hunted up an airship salesroom. After consulting the bulletin, he found a seventy-five-foot cruiser, which he purchased outright. It was hastily stocked with a few provisions and the captain entered his new possession. He took off his wet cap and slicker and strapped them to the wall of the cabin. After a hasty glance to assure himself that all was in readiness, he closed the radio power switch and saw from the instruments that the ship was operating perfectly. After starting the nullifying equipment, he slowly brought the nullifier up to strength. Another radio circuit closed and he was in touch with the source of potential energy. The ship was equipped with the old type of nullifier in which the potential energy was insulated against change or dissipation. In this way, by merely borrowing potential energy from a central power house while ascending, or sending it back to the plant while descending, it was not required to draw this energy

from its own power plant. And the ship, by merely shutting off the energy, could be made to remain stationary at any altitude.

All was in readiness. Gauthier opened the pusher and elevator throttles and the ship slid from its landing platform and into the night. He set his course over the route chosen for the limited with the idea that, eventually, he would run into the mystery zone.

Interested to know what was taking place in the office of the terminal, he tuned in the radio and television on the wave of the terminal. He grinned when he saw the commotion in the office. The official, still somewhat dazed, his jaw swollen and bruised, was explaining excitedly to others. Gauthier heard him tell all that he knew of the encounter, and watched the operator call the admiral. Presently, the admiral's face appeared on the television screen, which the captain could see. While those at the terminal explained to the squadron commander, Gauthier watched the admiral's face, purple with fury. The image of the terminal screen was very small; but there was no mistaking the admiral's attitude toward the affair. And yet, Gauthier thought, a hint of admiration was apparent, mixed with the anger.

Although Gauthier's telephone was tuned to the terminal's wave, he could hear very faintly the voice of the admiral as it carried from the terminal loud speaker to the terminal microphone:

"Just wait until I lay hands on that young man! I'll teach him to rob files! He's been taught to know better—"

Gauthier did not wait to hear more, but switched off his radio equipment and turned all of his attention to following the route of the limited. It was his idea to fly headlong into the zone of mystery and to trust to his wits after he got there. He felt as must any explorer who is going into the unknown; thrilled, though, he admitted frankly, frightened at the prospect of flying deliberately into what was certain death. But it was not so much death as the silent, unknown forces behind the thing that gave him a sinking feeling in the pit of his stomach.

He now had the throttle wide open. The night was silent except for the slight patter of rain drops striking against the outer hull. As he approached the location of the danger zone, he wondered whether to fly into it at an altitude of twenty miles or so or to come closer to the surface. Making some rapid calculations on his slide rule, he came to the conclusion that, at an altitude of ten miles his momentum might overcome any resisting force from the surface and carry him to the island which seemed to be the center of the zone, yet, even at such a height, he might overshoot his mark. Considering this possibility carefully he finally decided to risk everything by an approach to the zone with the ship almost touching the water. He would, in case of trouble, take to the little collapsible boat that rested in the safety locker and be motored to the island. Before actually entering the zone as he had calculated it, he tuned in the news service.

Nearing the Zone

HE learned that three more liners had vanished and that another tug of the transpacific service had also fallen a victim to the mysterious powers. All traffic over the Pacific had ceased—freight and passenger ships being routed over devious ways. The commercial world was upset; and in transportation circles there reigned a chaos from which dispatchers and traffic managers were frantically struggling to bring order. So upset was the world that transoceanic passenger travel was almost at a standstill; except for the few venturesome people who are ever ready to defy danger.

Gauthier changed the wavelength of his transmitter by dialing a number, and was soon in touch with an operator at his former headquarters. He asked to be put in touch with Cando, a brother captain. After adjusting their televisors, they could see each other.

"How are they coming with the new nullifier?" he asked Cando.

"They tried out the *GA* about midnight. It works like a charm, but there are several changes to be made. They are up with it now for another trial. The admiral has ordered three of the battleships equipped with them, and the whole gang of ground men and the crews of several ships are working to make the change. But where are you? The admiral was sore as a boil for a while this morning. I thought that he'd wreck the squadron. When I asked when you were coming back, he blew up like an old tire. When he got through telling me what he thought of you and what he thought of me for mentioning your name, I thought I'd shivered my way down to China. What in the world did you do or tell him?"

Gauthier grinned: "I extended my leave and he probably didn't like it."

"Didn't like it! Oh no! Seems to me that it did annoy him a trifle."

"Now listen," Gauthier laughed: "I am on my way over the route—the new secret route—of the limited between San Francisco and Shanghai. When they send out a ship with the new nullifier attached you tell the admiral where I am, so that they will know how to find me."

"Listen yourself," the other bantered: "The 'old man' says that you are under arrest; so that your orders don't count any longer. If you have anything to tell him about yourself, you'll have to do it. I made a mistake the first time I mentioned your name; but if I do it again it will be plain suicide."

They broke the connection, and Gauthier smiled grimly. He knew that Cando would give his message to the admiral when the time came. There was not an officer in the squadron who would not defy the whole nation for him.

But he was nearing the zone of mystery and it was necessary to lessen his altitude. He dropped down gradually to two hundred feet, sending the potential energy back to the central plant as he neared the earth. It was requisite to keep a balance always between his altitude and the amount of potential energy, just as though gravity had not been nullified. At this low altitude he slipped along at much reduced speed.

As he neared the danger zone, Gauthier tensed himself for whatever might come. He had no idea of what was eventually in store for him; but he felt sure that he would lose contact with the outer world, as warships had done. But how? That was the question that was uppermost in his mind now, even crowding out the thoughts of Bernadine. He was within a hundred miles of the zone, as he estimated its position, and all was dark. In the light of his searchlight he could see the waves billowing and rolling close below him. There was not another ship in sight. After another fifty miles, Gauthier dropped to a hundred feet and turned off the searchlight. He set the automatic altitude-stabilizer and looked out through the conning tower.

The sky was dark and the rain was falling in hissing torrents. Flashes of lightning ripped and tore through

the clouds, making the scene appear as a flickering picture. When the lightning flashed he could see ragged clouds roll and crash in the wind. Occasionally the ship jarred and trembled, and he heard thunder bursting and rolling away across the heavens.

He was near the critical point, and he reduced his speed still more. He wondered if his little boat could weather the storm, should he be forced to leave the airship. Perhaps he should wait until the storm was over. But there was the darkness in his favor and it might be possible to land the ship on one of the islands without being detected. He decided to keep on and trust to luck or to his wits in case of trouble. Entering the zone, now five hundred miles from the islands, he tensed himself for whatever might happen. At four hundred miles there was still no trouble, but the strain was now beginning to get on his nerves. He wished that something would happen, and increased his speed slightly. Three hundred miles, and still the ship performed normally! He longed to call someone to break the chill foreboding that gripped him; but he dared not send out signals for fear that some direction-finder might spot him. He was now certain that the phenomenon was not a natural one, unless its source were shifting about on the ocean. He was now only a hundred miles from the Islands, and reduced the speed once more. There would be less danger of an electronic-blast detector picking up the activity in his power plant. He became occupied with the problem of finding a suitable landing spot that would be hidden from chance discovery.

Going through the charts of the group, he found Bukewian Island. After a careful examination of a contour map, he decided that near the center of the island he might find a spot sufficiently secluded to afford hiding. But he had no opportunity to peruse his charts further; for he was now almost upon the shoreline and he could see the flicker of lights through the rain. He reduced his speed to about one hundred miles per hour, and increased his altitude to two thousand feet. The lights of Jubon lay spread out below and everything seemed peaceful and mysterious and quiet. It was almost as though the island which had been the scene of some infernal mischief was now trying to appear innocent and shy. Taking his bearing from the village beneath and from another in the distance, Gauthier changed his course slightly and headed for the wilderness. The rain had almost ceased and the clouds were curling away, revealing some of the stars. There was the first hint of dawn in the east.

Captain Gauthier was just congratulating himself upon his good fortune when it happened. For an instant he did not know that anything was amiss except that his tiny instrument board light was snuffed out. He looked out of the glass conning tower and saw that his ship had listed over; that the earth was hurtling up toward him! For a fraction of a second the captain was fascinated by the rush of the ground toward him; then he drew himself together with a jerk. With a swift motion he opened the potential receiver to its utmost and snapped on the emergency control.

CHAPTER V
Captured!

AGAIN he looked over the side and was horrified to find himself still falling, as though he had made no effort to save himself! This, then, must be the end, he thought. The horror of his helpless situation seemed to send a thousand wild thoughts racing through his mind. But there was nothing to do but brace himself for the shock and, no doubt, his death. Unable to breathe, the captain waited for the terrible jolt, and the rending and twisting of the tons of iron and steel. He heard the hull brush against something—perhaps a palm. He closed his eyes and grasped the arms of his chair.

Just as he expected everything to go black, the ship slowed with amazing swiftness; as though it had dropped upon a gigantic cushion. So quickly was the force of the descent absorbed that the captain could scarcely retain his consciousness against the sudden change. For a moment he was held motionless. Then, looking out, he found that his ship had settled gently to the ground and that he was surrounded by a detachment of armed men. A powerful light was directed into the cabin and a dark face peered through the glass. Gauthier thought of his disruptor gun strapped to the wall at his side, but he perceived some of the deadly instruments directed at him from without. As there was nothing else to do; he raised his hands and two men entered the ship's cabin. They were dark-skinned, with black eyes and black hair; but the captain could not definitely place the nation from which they came. He was tied up; and while one of the men guarded him, the other, after issuing brief orders to those outside, took the controls.

Evidently the mysterious influence that had interfered with his ship had been withdrawn; for the dash-light blinked on and, with the strange pilot at the controls, the ship lifted into the air. Gauthier could not see where they were going, but he was sure that they left the island. It was some time before they landed and he was ordered out of the craft. He was astonished to see that they were now in a huge cavern, evidently hastily formed, for the walls were rough and appeared half-finished. Far down at its other end, he saw the blinding glare of released atomic energy, and knew that men were at work excavating to enlarge the monstrous cavern. But what astonished him most was that many freight and passenger ships were crowded into the cavern, and that crews of men swarmed over them, equipping them with disruptors for battle.

"So!" he thought, half aloud: "The pirates are stealing commercial ships and building a war fleet."

"Say," he addressed one of the men who guarded him: "What are you doing here? Don't you realize that you are placing yourselves in position for a lot of trouble? Just wait until our war fleets drop down on your nest!"

Whether the man understood him Gauthier did not learn, for his attempt at conversation elicited nothing but stupid stares. His captors merely locked him in a prison cell, evidently to wait for someone with authority to dispose of him.

The steel grate clanged shut and the captain turned to examine the room. It was about ten feet square and contained a bed, chair and table. The walls glittered with crystals of all colors, that gleamed and sparkled in the rays of the cold-light apparatus. He examined the furniture. It was made of steel, and welded together so carefully there was nothing to tell that it wasn't made of single pieces. He examined the walls and found, as he expected, that there were no doors or openings of any kind.

Eventually he threw himself down upon the bed and tried to think; but there was nothing upon which to attach his mind as a starting point for any solution to

the mystery. That these men were indulging in some colossal dream of power or social upheaval was evident. He felt relieved now that he had undergone the experience and found that there was still a chance for him to unravel the mystery and escape.

His fears about Bernadine were renewed. She was evidently held prisoner in this underground empire. He must find her and devise some means of escape. He was tired from loss of sleep and the strain he had undergone, and his mind persisted in wandering off to idle fancy, though he tried to concentrate it on his predicament.

He started up suddenly as the sound of jingling keys and the scrape of metal showed the door was opened. He sat up with a start when he realized that he must have been sleeping. A glance at his watch showed that he had slumbered for over seven hours.

A guard, whom Gauthier had not seen before, entered the cell and motioned the captive to precede him into the great cavern. The captain, looking about him, was surprised at the amount of work that had been done while he had slept. The men doing the excavating were now at the far end of the room, and appeared like ants silhouetted against the blinding glare of their disrupters. They had left huge columns to support the roof, and the cavern looked like a vast cathedral with stupendous stone shafts and an awe-inspiring vaulted ceiling. Unable to restrain his curiosity, he turned to the guard.

"What is the idea of all this?" he demanded.

An Empire Underground

BUT the black-eyed Oriental merely gripped his disruptor more firmly, maintaining an exasperating attitude of indifference, and shook his head with perfectly assumed stupidity.

The captain shrugged his shoulders, realizing he would have to await further developments for some information. The guard pointed down the cavern and motioned the captive to lead the way. As they proceeded, Gauthier recognized several of the ships. They walked in front of the craft, which had been moved, and were now in an orderly row. They passed the *G13* and the *G20*, and the captain felt an urge to overwhelm the guard. His captor, as if aware of his intentions, brought the deadly disruptor up with a threatening gesture and Gauthier subsided. They passed the great liner upon which Bernadine had embarked, and the captain saw red. His blood seethed with fury; but the guard kept him covered with the disruptor and he reluctantly continued down the cavern.

"At any rate," he thought as he strove to calm himself and justify his helplessness, "she is evidently safe for the time being, and I can't help her unless I am alive. Or perhaps they have—" He shuddered at the thought.

They had walked about half a mile and were near the center of the huge cavern. The captain was amazed at the number of ships that had been captured, and at the magnitude of the activity under way in changing them from commercial to war vessels. They had to wind their way about piles of war ordnance, and were several times forced to halt while they waited for workmen who were moving the machinery into the ships to allow them to pass. Although the activity had all the apparent confusion of a busy air terminal, there was every indication of order and precision in the activity. Gauthier, despite his concern for Bernadine and himself, was frankly curious, and marveled at the perfection to which these black and yellow men had matched the highly-organized methods of the most progressive organizations in the United States. He could see more plainly, now that they were only half a mile distant, the excavators at work. The frightful glare of their disruptors, as they released the atomic energy of the rock into which they ate their way, lighted that end of the cavern with a blinding brilliance. The men, with their grotesque helmets and bulky suits to shut out the frightful heat and blinding glare, looked like strange insects burrowing into the vast earth. Or, it was like gnomes and devils at work preparing uncomfortable quarters for the wayward, and those doomed to perdition. And above all other considerations came the question, "Why all this activity?"

There was a perceptible breeze now, and the captain realized that the breaking down of the atoms of the rock created an unseen atmospheric disturbance. Perhaps in some way the electrons were being built up into molecules of oxygen for the huge personnel of the underground nation. Gauthier was perplexed, but the guard plodded on with seeming indifference to this colossal activity. When they finally reached the approximate center of the cavern the guard prodded Gauthier with his weapon and motioned him to turn to the left. They walked between gigantic pillars of native rock which were set about two hundred feet apart. It was a quarter of a mile to the wall where they found a door.

Motioning Gauthier aside, and keeping him covered, the guard opened the door and indicated that the captive was to enter. They found themselves in a small room with two doors; obviously a lock chamber. With exits built in this way, the blast of new air from the disruptors could not interfere with the opening and closing of the door; and also could not blow into the next room a swirl of dust and dirt. The first door was closed behind them, and they emerged through the other into another cavern, not so vast as the first, but still very large. It was a great factory crowded with machines that were silently at work turning out various articles. The captain noticed a large number of the battleship-size disruptors under construction, as well as many smaller articles of war ordnance. Here again he noticed that the most modern equipment was in use; for there were but few men attending the many machines. All the apparatus was automatic; each machine attended to its operations with almost no human assistance. The captain realized that this project was immense; it was well-organized, efficient, and purposeful. "But for what?" He wondered, for perhaps the thousandth time.

The Potentate

ANOTHER lock chamber at the end of this factory room let them into what appeared to be a large office; at work were people of the same strange features as the others, operating typewriter-like machines. They continued through this room into what appeared to be a more private office and on into a larger room that was resplendent with oriental luxury. The glittering walls had been covered with rich tapestries and the floors were soft with gorgeous rugs.

"The den of the pirate," thought Gauthier.

At one end of the royal chamber was a golden throne on which reclined a dark haired, black-eyed man, who smoked with the manner of a *bon vivant*. His face was clean cut and handsome in an exotic way, and his robes shone with rich colors and elaborate hand work. He took no notice of Gauthier until the captain had been

conducted to the first step of the monarch's throne. The gold, Gauthier concluded, had been made by disrupting the molecular structure of rock, the atoms of which were converted into the glittering metal. He was amused when he thought of the simplicity and cheapness with which the metal could be obtained; but this potentate must needs reflect some of the artificial glory of the remote past. And perhaps, as a matter of psychology, he used this means to impress and control his subjects by recalling days of past splendor.

But Gauthier's reflections were interrupted by the mighty one himself, who turned nonchalantly on his couch-like throne and regarded the prisoner with inscrutable eyes; while his lips were twisted into a cynical and mirthless smile. For a full minute the great man looked to Gauthier for some sign of deference, but in this battle of wills the American returned his stare with stares that carried an obvious hint of amusement. This defiant ridicule was too much for the self-appointed ruler, and his lofty air gave way to a flush of anger that darkened his haughty face. There was something familiar about the Oriental, but the captain could not shape the recollections that were struggling in his memory.

"What is your name?" he asked in perfect English.

"Burke. What's yours?" the captain flung back.

Slowly the monarch gained control of the rage that seethed up within him, and his face assumed an impenetrable mask of indifference.

"Burke?" he questioned suavely and evenly.

"Burke Gauthier."

"And, from your uniform, I understand that you are Captain Burke Gauthier of the United States Air Service, attached to the experimental department of the secret service."

"Correct," said the captain.

The potentate lit a fresh cigarette, and inhaled deeply before he spoke again:

"Why did you come alone, and deliberately enter this region of danger?"

"I studied the phenomena, until I decided that there was a person or persons at the bottom of some great enterprise. Then I reasoned that they might need a partner, and so I came."

The Oriental looked at him steadily for a long time, but could not penetrate the flippant, irreverent attitude of the captive.

"How am I to know that you are not here as a spy?"

"A man of your perspicacity and profound knowledge of the human mind must pierce my personality and understand that I could not hide anything from you—and I know better than to try."

"Why did you come in uniform, instead of changing to civilian clothes?"

"I hadn't thought of that. Really, that I was in military uniform had not entered my head at all."

The monarch evidently decided that a military spy would have come in civilian clothes. He dismissed the guard.

For a time he smoked in silence; apparently in deep thought, but in reality, as Gauthier understood, trying to impress this American with his deep insight and profound mental processes. Gauthier inwardly laughed at him.

"Say," the captain broke the silence. He understood the psychology of meeting a man on his own ground, instead of gazing open-mouthed at the outward show of offensive and defensive paraphernalia. "What is your game, and what are the chances of my taking a hand in it? Don't fool yourself by thinking that all this junk you have surrounded yourself with makes any difference to me. You are just an ordinary human being like myself, though you have a trick up your sleeve that looks good to me." He smiled confidentially as he spoke. "I recall you now. I thought that there was something familiar about your appearance, and now I remember. You graduated from Yale just a year before I."

This understanding and good-natured ridicule were too much for the monarch. He descended from his lofty perch and smiled as he flicked the ashes from his cigarette.

"You are clever, though I recognized you at once," he admitted. "I have dreamed of having such a partner; although, of course, he would have to assume a secondary position to all outward appearances—a man with whom I could talk confidentially as an equal. And you have forced me to recognize you as one who looks behind the scenes."

CHAPTER VI
Gauthier Plays the Game

GAUTHIER walked up the steps and sat down familiarly on the throne, forcing the monarch to move a little to make room for him. He was now looking down at the self-appointed ruler.

"Just what are you up to and where do I come in?" he asked, lighting one of the Oriental's cigarettes which he took from a golden box nearby.

The audacity of this American prisoner was disconcerting, and the Oriental felt premonition that here was a man who might steal his glory from him. And the very mental gusto of the man seemed to rush his thoughts into confusion. His efforts to remain casual were noticeable, and Gauthier watched his every move.

"As you know," the monarch began, " the Oriental races have been more or less abused by the white races, and I am the great leader who is to emancipate them from this bondage. In other words, I am going to make the world safe and comfortable for them. It seems to me that they have been trodden upon long enough, and they are now about to assert their rights. Even now we are throwing your world into confusion, by capturing a priceless fleet of ships. And we have only started! Think what it will mean when we can live on an industrial and social equality with your world!"

As he talked his emotions were almost too much for him, and the captain smiled triumphantly.

"And you have capitalized this unrest and are now about to make yourself a man of power over more than half of the world! All this finery you have surrounded yourself with tells me that you are building a barrier between yourself and your subjects that they might not see your true ambition. If history means anything to you, you must know that any man who starts out with such an ambition invariably stumbles, and the people whom he was leading pass over his body in their progress."

The brown hand that held the expensive cigarette holder trembled very slightly and Gauthier knew that he was getting beneath this man's skin. He grasped the opportunity to continue the advantage he had gained

"Just how," he asked quickly, "am I to figure in this stupendous 'graft'—for we may as well call it by its right name now, that we understand each other?"

Again the brown hand trembled and the captain watched the Oriental's features narrowly as they struggled to remain impassive.

"I would suggest that you remain for a time; and after you have seen the certainty of our success we will discuss this phase of the matter. Although you are technically a prisoner, I shall give you more or less freedom until we have come to some definite conclusion."

As the man talked the captain detected an almost imperceptible flicker of the brown eyelash and an involuntary movement of the facial muscles and knew that the speaker lied. "All right, old man," he thought, "you are afraid that if you order me killed I'll tell the others the truth before I die; but a knife in the back some dark night would be different. I'll watch you." Aloud he assured the swarthy potentate that he was very much interested in the technical phases of their undertaking.

They had breakfast together. It was a meal served with all the pomp and glory befitting a ruler; there were delicacies of the Orient served on dishes of some opalescent material by servants picturesque in their finery. When it was finished, they made a personal tour of inspection. The royal guard was summoned to display to all the Orientals the greatness of their ruler. The royal train first visited the prison, where all the men and women captured on the stolen ships were kept behind bars.

"You see," the monarch turned to Gauthier triumphantly, "I am not making the mistake of killing prisoners, but am keeping them until the balance of power is definitely in my favor. When I am the most powerful man in the world they will be willing to become my subjects; for it is a human trait to wish to associate yourself with the most powerful group. That is to show you that I am a wise man and shall not make the mistakes that other men with great ambitions have made. I am sure that you will concede me—that I am starting right."

"So far," admitted Gauthier, with exasperating unconcern.

They looked into various barred rooms in which were crowded men, and others in which women were grouped. The prisoners seemed dejected; but the captain noticed that they were not subdued, and smiled at the foolish assurance of the monarch. He was not surprised that there were thousands of people confined here, for a single air-liner carried enough passengers to populate a small town. They passed from one room into another and as they neared a certain barred door the captain noticed that the monarch looked to his clothes to make sure that they were in order, straightened perceptibly, and ordered the guard to straighten its ranks.

Bernadine!

GAUTHIER watched these preparations and grinned: "A special prize here," he thought.

The mighty one knocked at the door and it was opened, leaving only the steel grate. With the Oriental woman who stood in the door, he conversed in a tongue that the captain could not comprehend. Instead, he looked past the woman and started violently. Lying on the floor, amid all the colorful finery that could come to the imagination of the most extravagant oriental, was none other than Bernadine! Her face was turned from the door, but there was no mistaking her. And her shoulders were heaving with sobs.

The emotions that passed through the captain in that moment rocked him from head to foot; but he regained control of himself and busied himself taking in every detail of the place and laying plans for her rescue. He was thankful that the monarch had his back turned to him; else his agitation would surely have been observed, and his own career would just as surely have come to an abrupt end. When the incomprehensible chatter had ceased and the door was closed the captain was making a minute study of the cavern. There was nothing to indicate that a silent storm had raged in his mind. He dared not think of what might have happened had Bernadine seen him.

The ruler seemed to have lost some of his omnipotence during his talk with the attendant. When they were out of the room he explained to the captain that Bernadine was the woman he had selected to be his queen.

"She is a bit shaken from the experience of her capture; but she'll come to her senses in time and realize what an honor and priceless opportunity is hers," he added.

Gauthier turned his head aside to conceal his emotion. Little did the monarch know what a turmoil his flippant words had set up; nor did he realize how close he had come to sharing an ignominious and humiliating scene.

They wandered through other quarters in this amazing underground nation. In many places they found men at work with disruptors enlarging some rooms and adding others. Everywhere they found activity; but not one of the men was too busy to bow and show homage to his impressive ruler.

Although Gauthier took an intense interest in all that was going on, he kept his sense of direction and noted carefully every detail; in order that he might find his way back to the prison wherein Bernadine was held. At last they arrived in a part of the fortress that interested Gauthier more than anything else he had seen. This cavern was smaller than some of the others, being no larger than three city blocks in length and one in width.

But it was the array of strange equipment that interested the captain. There was a radio power-receiving apparatus of the conventional type, with its remote-control switchboard, covered over with red and blue pilot lights. Gauthier noticed that there was equipment for a number of wavelengths and understood that the monarch was stealing current from each of several powerhouses that they might not notice the heavy drain. But at the other end of the room was equipment that he could not associate with anything he knew. There were four huge globes made by winding one-inch copper tubing on skeleton frames. These were about two hundred feet in diameter. In the center of each globe was a parabolic-shaped reflector of wire grid, which was focused upon a slot in the side of the globe where the tubing had been slightly distorted to leave an opening. Each globe was raised on a universal mount, which permitted it to be moved and the slot to be pointed in any direction. Finely graduated scales, about six feet in diameter, gave the degrees of rotation in any direction. A huge air-core transformer and oil-immersed condenser near each globe told the captain that here was apparatus using oscillating current of some sort.

"This," the monarch swept his arm about with a lofty air, "is the heart of the venture. With this apparatus we are able to paralyze the nullifiers of any ship by establishing a zone over any spot on the surface of the earth. We merely direct a beam from each globe around the earth and, where they all intersect, the zone is established. To shift the zone all that is necessary is to orient the globes differently to bring the intersection to

another point. Now you see how helpless your world is!"

The captain was interested and absorbed every detail for future possible use: "Then, when the ships were routed over a different course to avoid the original location of the zone, you merely shifted the zone?" he asked.

CHAPTER VII
How It Was Done

THE Oriental laughed: "Exactly! They thought that they could avoid the trouble by going around it, so I merely moved the trouble. We have men in the present zone to take charge of the ships that are brought down. It won't be long now until we shift the zone to the trade-routes of the Atlantic. In a short time we shall have captured enough ships to control the shipping of the world and it will be only through the consent of our government that other nations will be permitted to operate ships at all!"

"Very clever," said Gauthier: "Did you invent this apparatus? I have never seen anything like it before. How does it work?"

"I invent this! No. Why should I waste my time on things like this? No, I purchased it from an inventor I found in Chicago. I really don't know the underlying principle of it myself; but I have men to operate it, so that is all that is necessary."

"What in the world did you have to pay him with?" Gauthier asked in surprise.

"A half-interest in the venture. I am keeping him in jail now so that he doesn't run away from his half-interest. One never knows when another might change his mind and, under the circumstances, it is safer to keep him where I can always find him." The monarch smiled cynically.

There was a quality of deadly finality about that reply which reminded the captain of an adder about to strike. He was determined more than ever to keep on his guard. He felt that the Oriental was only playing with him until the final moment. He realized the monarch had no regard for the life of any man; and that it was only a matter of a game that Gauthier should be disposed of silently and secretly.

His attention was attracted by unusual activity among the operators. Orders flashed, switches were closed and messengers ran between the radio operator and the crew. There was a loud buzzing sound from a quenched-spark gap, the globes emitted a brush of violet light that crackled, and the air was heavy with the smell of ozone. On a televisor they saw a great air-liner foundering down to the surface of the water.

"They are bringing a ship down," said the monarch.

Presently other orders flashed, the buzzing sound ceased; and all was normal.

"So cheaply do we build our fleet," the Oriental laughed.

They wandered through other chambers, many of which were under construction and then found themselves again in the throne room. As if tired of this farce, and wishing to dismiss the white man, the ruler called a servant and gave some brief instructions.

"He will show you to your room," the Oriental said as he dismissed Gauthier: "Of course you are free to wander about as suits your pleasure. A warning, however. You are under surveillance until such time as you prove your sincerity."

The captain smiled: "I expected that, so don't think that your precaution embarrasses me. In fact, I am glad that my future partner is so cautious." And under his breath, "There is none so sincere as a dead man."

He followed the servant into the smaller cavern, furnished rather luxuriously with soft rugs and tapestries. There were a number of rooms opening upon it, and into one of these the servant led the way. The sleeping quarters in which the captain found himself were of modern comfort but with a decided Oriental appearance, while a shelf of books gave it the impression of being the retreat of some students of luxurious tastes.

The servant, when he had concluded from their sign language that he was no longer needed departed, and the captain threw himself upon the bed to formulate some plan of action. There was plainly only one thing to do first and that must be done immediately. But how to rescue her?

Gauthier Acts

FOR a time Gauthier cast his mind about for a possible answer, and finally decided to roam through the underground caverns and acquaint himself more with the layout. He went outside and found a guard stationed before his door; when he left the corridor, the guard followed him, with a deadly disruptor in readiness. Like a shadow he pursued Gauthier through the various rooms, through guarded doors and among the various machines. Wherever the captain went there were guards, but no questions were asked; nor did the guards appear to notice him. The captain shivered at the apparent perfection of the net about him. He realized that all had been warned to watch him. The moment he turned his back he could feel those black eyes boring into him.

Watching the landmarks he had mentally recorded during the former tour of inspection, the captain drew nearer and nearer to the private prison in which Bernadine was kept. They were now in an adjoining room and were alone. There was some intricate machinery, evidently just being installed but as yet not in operation. The captain had been wondering what his next move should be and now, as he looked at this delicately-adjusted apparatus, an idea flashed into his mind

His heart beating heavily with excitement. Gauthier tried to appear idly curious as he wandered among the machines. He stopped before one which he recognized as one of the new-type computing machines—very delicate and intricate in its adjustments and, once out of working order, very difficult to place in operation again. He looked around, under and over the device as though he had never seen or used one himself. The guard, as he saw from the corner of his eye, drew closer, as though fearing that Gauthier might disturb the complicated machinery. When the Oriental was quite close, the captain began to examine the apparatus more closely; touching it here and there and finally grasping one of the adjusting levers by way of experiment. The guard rushed toward him, with hands outstretched to stop the captain from changing, of all adjustments, this one. Gauthier watched his chance, and, when the guard was too close to use the fearful weapon in his hand, the captain straightened up suddenly, bringing his fist up almost from the floor to the chin of the Oriental. It seemed to Gauthier that the man actually left the floor under the impact; he fell back over a packing crate and lay still under another machine, the disruptor clattering to the floor.

Quickly Gauthier picked up the weapon and then

went to examine his victim who was thoroughly subdued and took no interest in his surroundings. The captain tied him securely with some bits of wire that had been around a packing case and forced a gag into his mouth; then dragged him behind one of the machines, and tied the man's legs to a brace on the machine so that he could not roll out and attract attention nor thump his shoes against the floor to signal for help.

Quickly Gauthier ran to the door opening on the prison corridor in which Bernadine was held. He opened the door a little and peered through. There, before her prison door, stood a guard holding his disruptor. There seemed to be no one else in the room. With a sudden motion Gauthier flung the door wide and covered, with the deadly disruptor, the astonished and terrified guard. The latter immediately threw up his hands, his beady eyes aflame with humiliation and terror. A hasty search revealed no hidden weapons and the captain motioned the man to stand aside while he picked up the fallen gun. He now stepped back from the grate over the door and, closing his eyes for an instant to protect them from the blinding glare and terrific heat, he pressed the trigger of the gun, at the same time sweeping the weapon quickly across the lock.

There was a wave of scorching heat, and a flash of light from the disrupted lock, that bit through his closed eyelids with blinding brilliance. He reopened his eyes, to see the guard trying to steal away under the protection of the confusion; but quickly marched the man back to the door. The disruptor had cut through the lock, and bitten deeply into the native rock of the wall behind the hasp. With the man's own clothing Gauthier tied up the Oriental and shoved a gag into his mouth; then opened the grate and shoved the door open a trifle. There was Bernadine, lying upon a couch, and the native woman hovering over her charge. The two were alone.

Dragging the helpless guard after him the captain backed into the room and closed the grate and door. So astonished were the women that for an instant all were motionless. The tableau ended with a cry from Bernadine who leaped from the couch and flung herself upon Gauthier; and Burke struggled for air.

With the help of Bernadine, he bound and gagged the woman and tied her to a leg of the couch. The guard they tied to the massive table in such a way that he could neither move nor make a noise. They were now confronted by the problem of escaping from the haunt of the underground nation without attracting the attention of the numerous guards and workmen.

"What is on the other side of this wall?" the captain asked after they had embraced each other again.

"I don't know. I never heard anything through that wall, although I can hear occasional scraping and hammering through the other three walls."

Escape!

GAUTHIER stepped back from the wall and, shielding Bernadine, brought up the disruptor and pressed the trigger for an instant. When the blinding after-image had cleared away, the captain peered through the one-inch hole that had been opened through the wall. His heart leaped; he saw a spot of daylight at the other end of the orifice, through a ten-foot wall of solid rock, but could not see more. He thrust the end of the gun into the hole and, with the trigger pressed, moved the stock in a circular motion; in this way he cut out a cone of rock and spared them the discomfort of the frightful light and heat. They heard the dull rumble as the rock fell out.

Again he put his eye to the hole; the disruptor had cut out a cone, leaving what might be regarded as a huge funnel with the small opening inside the room. The cavity had been extended toward the side of a hill, and dust and dirt from the rolling plug still hung in the warm air. A little way from the foot of the hill the Pacific scrubbed restlessly at the clean beach, while overhead a sea gull darted and twisted about. But there was no one in sight.

Again the captain thrust the gun into the hole and cut out another cone, this one much larger than the first. The rock fell from the face of the hill and broke into fragments that rattled and slid down the slope. This last cut had made the wall quite thin and he now stepped back to the opposite wall. With a quick circular motion he cut out the thin plate of rock and it fell to the floor with a thud. They rushed through the opening and looked out. All was peaceful and quiet.

The captain gave one of the disruptors to Bernadine with instructions to keep watch on the surrounding hillside and went into the next room. Presently he returned loaded down with electrical apparatus—a radio telephone and a televisor. Together they climbed from the opening and hopped and slid down the steep hill. At the base they found a thick clump of trees and underbrush—a spur of the forest that grew a short distance away. Following this fringe of trees until they were hidden in the thick forest, they found a space that suited their purpose and the captain connected the apparatus he had borrowed. When all was in readiness he dialed a number and presently the face of the admiral appeared on the screen and his voice came to them. Gauthier saw the face of his superior darken and hurriedly told him of the experiences he had gone through. The admiral quickly forgot the reprimand that was on his lips and became absorbed with interest.

"Where are you now?" he asked.

"I don't know where, but I am sure that we are some distance from the zones. You better hurry and take bearings on my phone transmitter to get our location. We may be discovered at any moment."

"Just a moment!" The admiral turned to an orderly whom Gauthier could see on the screen. He heard the instructions given; and knew that in a few seconds a hundred stations in various parts of the world would train their direction finders upon his transmitter and he would soon be located almost to a mile.

The admiral now resorted to code; and Gauthier deciphered that his new nullifier had been installed in three war ships and that these were already on the way over the route he had flown. "I'll change their course as soon as we find your location," he added.

Gauthier and the admiral broke connections, and the captain tuned about until he found the secret wave of the potentate. The set had been designed to pick up this wave, which was far below the regular channels of communication. Switching off the television pick-up so that he could see without being seen he tuned this instrument also, and now saw the ruler reclining upon his couch. Evidently the escape had not been discovered, for the potentate was calmly smoking and seemed to be at peace with himself. Presently one of the guards rushed into the presence, and chattered rapidly. The monarch leaped to his feet and pressed a button. In a trice the room was crowded with guards, all armed and eager. From the actions of the monarch, although he could not understand what was said, Gauthier surmised that he himself was to be destroyed on sight. The instruc-

tions given, the room was cleared and the monarch was left alone to pace the floor in a fit of restless fury.

Leaving Bernadine to watch the televisor and to talk with the stations that were busy getting their bearings, Gauthier climbed a tree from which he could see the opening he had cut in the hillside. Men were pouring out of the hole and covering the side of the hill, while two by two went ahead, tracking the fugitives.

Quickly the captain slid down the tree and told his companion what was happening. He tore the units of the radio equipment apart and threw them into a dense patch of underbrush where they would not be found, and then led the way deeper into the forest. Employing every trick he could think of, he led Bernadine along fallen logs, over bare spots of rock and finally up into a tree that stood on the edge of an exceptionally dense growth of timber. Carefully they worked their way along the branches from one tree to the next until they found one with heavy foliage. They climbed high into this and made themselves as comfortable as possible. From there they could see their surroundings, and understood that the forest was ringed round with a cordon of soldiers while others searched among the trees. Gauthier was not interested in these as in watching the sky. But there was nothing in sight.

Desperate Moments

FOR an hour they sat waiting. They could hear the searchers moving about whenever groups happened to come close to their hiding place. They saw another man emerge from the face of the hill holding in leash two dogs, which bayed as they picked up the trail and followed it into the forest. The fugitives heard the dogs stop in confusion at the tree they had first ascended. There was a flash of light, and they knew that one of the men had severed the tree trunk with a disruptor. They watched and saw the top of a tree tremble and sway uncertainly and then fall with a crash of breaking branches. Bernadine trembled and Gauthier held her hand.

Evidently certain now that the fugitives were somewhere in the thick growth, the guards fell to work in earnest. Flash after flash of light brightened the forest and the air boomed and vibrated with the noise of the falling giants. Ever nearer and nearer came the pursuit to the tree in which they were perched. Never before had the captain been in a more desperate situation; to remain meant certain death and to give themselves up meant death for himself and worse than death for Bernadine. To try to fight a way out meant only to be overpowered by sheer numbers. He thought of ending it all before they were captured or killed and his hand tightened involuntarily on the disruptor. Bernadine saw the gesture and stayed his hand. The searchers were so close now that a tree fell against their hiding place, and they were almost shaken out of their hiding place by the impact.

They could now see some of the men as they worked on the few remaining trees. It was a matter of a few minutes now and all would be over. Again Gauthier's hand tightened on the disruptor and Bernadine, although she saw, did not try to stop him.

There was a shout. Others took up the cry and Gauthier, his heart beating wildly, looked upward. Glistening in the sunlight, a four-foot parachute floated in the light breeze. But there was not a ship in sight!

They watched the little 'chute fall, as did everyone else. Forgotten for the moment was the man-hunt. Several natives clustered about the place where they calculated that the 'chute would land and waited. It neared the earth and there was a scurry as the watchers changed their postion to catch it. A man clutched the weight and the little parachute collapsed. A piece of paper fluttered in his hand as he opened the message and read. He waved his arms and shouted some unintelligible words and ran with the message toward the stronghold under the hill.

All eyes were turned upward searching for the invisible source of the 'chutes. Presently another parachute materialized from apparently nowhere and blossomed out. They saw it fall and catch in a tree. Quickly one of the Orientals climbed the tree and retrieved the message. There was more shouting. Gauthier chuckled when he saw the fear and panic spread among the men. Here indeed was a new and terrible unknown fear to bow down before and worship. He watched the men throw away their weapons and assemble in ranks, evidently to orders from the invisible terror that lurked above them. Presently the ruler, surrounded by guards, came from some hidden door in the hill and stopped before the ranks. It appeared to Gauthier that he was unbraiding them and issuing orders; but, despite all the threats he appeared to be pouring out at them, they disregarded him and stared upward.

There was a murmur of panic when a third parachute materialized out of the clear blue sky and floated down. Even the monarch was impressed and his guards threw away their weapons and raised their hands.

Gauthier assisted Bernadine from the tree and, together, they climbed over fallen logs and around tangles of treetops to the edge of the clearing. Covering the assembled men with the frightful disruptor he advanced until he was about a hundred feet from them and waited.

"What is all this?" the monarch asked when he could control himself and speak: "I have moved the zone to cover this spot but it does not seem to affect the ships up there."

Gauthier smiled: "Wait and see."

Suddenly the great shape of the captain's own ship, the *G2*, materialized out of apparently nothing. It had landed before it became visible and now it stood, tangible and formidable. A heavy timber that had been lying on the ground, and upon which the ship happened to rest, now buckled up in the center and snapped under the tremendous weight that pressed it into the soil. Another ship, the *G4*, suddenly materialized a short way from the *G2*, and, in a few moments the crews poured out of the ships. Quickly, the natives were put in irons and Gauthier and Bernadine were answering a thousand questions. Details of armed men were dispatched to the hill, and presently the prisoners of the potentate came pouring out of the various openings in the hill.

An orderly approached the captain and saluted.

"The admiral wishes you to report by radio immediately, sir."

Gauthier hurried into the *G2* and tuned in on the admiral's wave. He saluted the distant officer and waited for the storm. But his superior seemed not at all displeased.

"I have taken your case up with the Department in Washington and they wish to see you as soon as possible." His eyes twinkled: "I am not sure whether they wish to give you a spanking or a promotion or both. And by the way, are there any arrangements I could make here for you so that everything will be ready when you return?"

Gauthier laughed. "I'll ask her and unless I telephone

(*Continued on page 748*)

The Red Ace

By Eugene George Key

(*Illustration by Paul*)

As we increased our power we must have heated their machines so intensely that we finally melted parts of it. At full power the machine caved in and flowed away like water.

WHEN the light machine gun was first developed, criminals were quick to make use of it. In fact, they were using it even before it was adopted by the police. They seized avidly upon the advantages of the airplane, and the bombing of enemies from the skies is a frequent practice of our criminal classes.

But the really scientific criminal does not stop there. In fact, he probably will disdain to use any such crude weapons as bombs. He will make use of all the latest developments of science, and, if that fails, he will invent some devices of his own. He is, therefore, always a step ahead of society and always in a favorable position to commit a number of his depredations before he can be apprehended.

Nowhere is this made more vividly apparent than in the present story. It is an unfortunate commentary on our social life that we do not anticipate these developments from our criminals. In popular parlance, we do not lock the barn until after the horse has been stolen; and, even then, society is at a terrific disadvantage because, where the criminal is acting under a unified plan, the forces of society that would apprehend him is always composed of a multitude of persons and personalities, some of which have neither the equipment nor the intelligence to combat the outlaw.

Mr. Key has also made this very clear and he has shown us convincingly that the only man who can battle the scientifically-equipped social outlaw, is a scientist.

EUGENE GEORGE KEY

Burleigh, Illinois.
Friday, June 29, 1956.

DEAR OLD BERRY:

Sorry I couldn't write you for so long, old topper, but I've been busy. But, then, you've probably seen a great deal about it in the papers. Naturally enough, though, the papers couldn't tell the story right. Oh, it was good enough for the average reader who doesn't care what he reads, but for you—well, I'm going to tell the whole story now. Hope you don't get tired reading it.

There is no need to introduce to you, my father Horace Golden, president of the Golden Air Lines, operators of a fleet of planes from New York to San Francisco and Los Angeles via almost any city you like, even Burleigh. Until about a year ago, as you know as well as any one, the lines had the reputation for the best service in the world for maintenance of exact schedules, and complete safety. Then came the nemesis.

Poor Dad! Even as I write I can see his face, all screwed up and wrinkled, like a man with a heavy burden on his mind. His hair, black in spite of his age, turned white in a week and tried to turn whiter. Profits on the line stopped. In fact, the thirty per cent dividends the line had paid ceased and profits turned into losses. The cessation of dividends brought the stock down like a comet, and caused depression all through the market.

And it was all caused by a single solitary plane!

Everyone knows of the *Red Ace*. It was a huge plane, painted red all over except in two places: the doors at the front. On those were painted large Aces of Diamonds. That's why we called it the *Red Ace*.

There were no propellers or motors visible. We could hear it pump something, and it certainly made a noise—like a hundred unmuffled motorboats all going at once. The thing didn't need to be silenced. We soon found that out. At least, some fliers at the Chicago airport did.

The *Red Ace* was shaped like a sausage with a shingle stuck clear through. The nose was pointed, of course, but the rest of it was just like a sausage—round and fat. The shingle represents the wings. From a distance—as near as anyone could get to it—it appeared as though the wings were one continuous piece of metal, reaching clear through the thing and out at the other side. Windows were all along the side. There must have been forty windows on each side, in four layers of ten each. Two windows were in the nose of the plane and one in back. The doors with the Aces painted on them were nearly the height of the craft, minus about six inches on the top and the bottom.

That was the contraption first seen at the Chicago airport a year ago, when it grabbed a three-million dollar shipment of gold.

It was at ten o'clock at night. The *Sentinel Express* on Dad's line was coming in from the west. It reported by radio that everything was fine. Tom Dooley, Dad's crack pilot, was at the control and the "dust" seemed as safe as a baby in a cradle.

"Tom gets a raise for this," Dad remarked, as the wing lights came into view not far away. "Heavy storm back there, but Tom is coming right on through. Great pilot!"

Pratt, manager of the Chicago port, was standing next to him.

"He sure is, Mr. Golden. Too bad there aren't more pilots like him. He's like Lindbergh was—dependable at all times."

"My son is a pilot like that. I've seen him come in through fog as heavy as a smoke screen, and land in the middle of the field without a waver. Wish he'd get that confounded light idea out of his head.

"You know, Pratt, my boy is a good pilot gone wrong He and that crazy Professor Schneider spend fifteen hours a day working on an idea to make light pick a paper bag off a table and keep it in the air. Such foolishness!"

"Well, Mr. Golden, the boy is young yet. Only twenty-four, isn't he? And he invented the apparatus

we're using now to make a plane land in a twenty-foot run. That invention saved this airport alone a thousand dollars in taxes last year, because we're using only half as much ground as we used to."

"Yes, that *was* good. But what good is a light that'll lift a paper bag into the air?"

"Have you ever seen the experiments your son is making?"

"No, but he's told me about some of them."

"Better leave him alone, Mr. Golden. When he was trying out that landing device, you said he was attempting to make a goat live on half his usual food. Well, we turned out to be the goat, and the field was the food. You don't know what he hasn't told you yet."

The Coming of the "Red Ace"

THE *Sentinel's* lights were now near the field, and the large searchlight was turned on, illuminating the port. The plane sailed over the hangars to within forty feet of the depot. It was still a hundred feet up. The wings swung from their usual horizontal position to an unusual oblique vertical, slowing the express down as quickly as an opening parachute slows a falling man. The motors were shut off as the plane settled gracefully to the ground, rolled twenty feet and stopped. What did it? It was the movable wings that I had invented to cut down the landing run. This landing was just another demonstration of how successful my idea was.

Of course, Berry, at the time all this happened, I was with Professor Schneider, working over our little paper-bag trick. Dad told me this story. If there are any errors in it, he is the one to answer for them. I was sixty miles away.

When the *Sentinel* landed, the armed guards from the bank crowded inside the baggage room and out on the field, forming a path for the gold to the armored car. As the last bag of gold was placed on the ground, a deafening noise attracted the people at the port. The *Red Ace* had arrived.

Its enormous hulk dropped quickly into the radius of the port lights. Unmolested, it dropped hook after hook to the bags of gold and hoisted them one by one to the big doors on each side of the plane. The police fired their rifles and pistols at the raider in an effort to shoot him down. It was hopeless. No sooner had the shooting begun, than an invisible force, like the strong arm of a Hercules, knocked the people down and held them there. Weapons were useless. The *Red Ace* calmly lifted the entire gold shipment off the ground and disappeared into the air.

When it was gone, the invisible force departed also. The victims on the ground jumped up and went into a frenzy. Dad ordered three planes to follow the raider. Police fired into the air, in the hope that one bullet might do some good. Everybody did something and everything resulted in the same thing—nothing. The *Red Ace* was gone.

From that hour my father's hair began to turn gray.

He didn't say a word to me about it, at the time. He probably thought that I was too much of a loon to offer any help. I had to depend on an inaccurate newspaper account of the story for my first news. Even then my most pointed questions to dad elicited only an impatient, "It doesn't concern you." But I felt it did concern me, even more that it did him. I'll tell you why, later.

The *Ace* made another raid on our lines a week later, again at the Chicago port. This time the raider escaped with a million dollars in registered mail and jewelry. That was enough to put the Government into the case in earnest. The insurance people were already on the job, making mere nuisances of themselves.

And all the time, Schneider and I were making our paper bag do tricks.

The Government joined forces with the investigation already started by the banks and insurance companies. Of course, it didn't mean very much, because nobody knew where the *Red Ace* went after the robberies. The investigators worked out plans for finding his hangout; but they were just like all other plans of such investigations—taken from theories, rather than from facts.

Ten fast planes were cached in the trees near our airport, the day another large gold shipment was scheduled to arrive on the *Sentinel* with Tom Dooley at the "stick."

At a quarter to ten, the signal was sent out to get ready. All planes were wheeled out from their hiding places and prepared to start. The helpers stood in front of each propeller ready for the contact. The pilots and mechanics sat in their planes ready to start.

Dooley again piloted the *Sentinel* into the landing area and stopped it at the unloading station. The gold was unloaded and placed on the ground. Again the pumping noise in the air drowned out all other sounds as the *Red Ace* appeared for its third raid.

The signal was given. One by one, the ten planes prepared to rise and give battle to the outlaw. One by one they started down the field for the take-off. The first rose and headed for the *Ace*, which was leisurely picking up gold bags while the people in the field were held to the ground by that mysterious force.

Seven planes had taken the air when the first arrived at the airport. That one acted panicky. It tried to rise, but instead lost height. As it neared the *Ace*, its nose suddenly turned downward. The plane crashed to earth, driven by a force more powerful than any it had ever felt.

Eight others followed and crashed nearby. One by one, the pilots fought to keep in the air; but, as their machines came under the influence of the *Ace* they crashed one by one just within the field, some of them bursting into flames. The last one, remaining in the air, was more cautious. He kept away at a safe distance from the raider and pumped machine-gun bullets at his enemy. The bullets might have been snowballs, for all the good they did. In fact they were dangerous to us. Ricocheting they sprayed among the people below.

As safe as though it were a peaceful plane on a lawful errand, the *Ace* took up the gold, closed its doors, and started upward. The last plane followed, firing its useless missiles. Up, up, went the brave little plane. Up, up went the *Ace*.

At fifty thousand feet the little plane was still rising. At seventy-five thousand feet, the noise the plane was following had disappeared entirely, but still the brave pilot went on. Just imagine, Berry, seventy-five thousand feet above the ground—nearly fifteen miles!

The altimeter froze. The pilot and the mechanic were nearly dead from the exposure and cold despite the equipment for operating at high altitudes. The mechanic fainted. As in a daze, the pilot leaned forward on the stick and they dropped.

Charles Mason, the pilot, fought to keep his senses. He gasped for breath. He beat himself with his hands to try to bring some feeling back into his body. A game little fellow.

No one knows how far they fell, but it must have

been somewhere near fifty thousand feet. The flyer checked his descent finally and began to spiral down. He went limp again, and once more the plane dropped.

The searchlights caught him as he neared the earth. At that instant he must have recovered for he righted the plane and began to spiral for a landing. He came down jerkily like a drunken man coming down stairs, but he landed with only a mild crash. One wing was broken.

CHAPTER II

We Enter the Game

THAT day our paper bag jumped three feet in the air and hung rigidly in the air, with nothing but our light ray to keep it there.

Mason lay unconscious three days. His altimeter, broken at the highest scale reading, gave proof that all known altitude records had been exceeded. His name and his mechanic's went down in the records as makers of a new official height—seventy-five thousand eight hundred feet. But it cost the mechanic his life.

Mason told his story to the detectives and reporters. It amazed the world that any plane containing human beings could go above seventy-five thousand feet, as he said the *Red Ace* did. "Impossible," said some people. "Only the ravings of a mentally unbalanced pilot." Only two people believed him: Professor Schneider and myself.

Mason was in the hospital for a month, during which time the *Red Ace* made two more raids on the Chicago port. Until then, it was the only port that had been molested although money was transported to and from other places.

Business people became cautious and refused to ship money by plane until the *Red Ace* was captured or destroyed. Business slumped terribly on dad's line. I guess you, as a big stockholder, remember it well. Dad's hair turned a beautiful silvery white in a week. The Golden stocks crashed to a tenth of their former value, pulling a great many stocks with them. A panic on Wall Street followed.

The Government as well as the Golden Air Lines, offered large sums of money to anyone who could catch the raider, or give suggestions that would help in detecting him. That was the time for Schneider and me to enter the game. And we did.

We had decided that the President of the United States should be the first to hear of our invention. We wrote this letter:

> "As we have perfected a device with which we may combat the *Red Ace* effectively we are willing to offer it to the government on condition that we operate it. We invite an inquiry from any of your agents.
>
> (Signed) *Professor Emil Schneider.*
> *James Golden*"

Ours was one of several thousand similar messages sent to various government officials. Accordingly, we waited six weeks for a reply. It came, finally, after seven further raids of the *Ace* had increased the wave of panic sweeping the nation.

The bell on our laboratory wall rang one day, and I answered it. There were nine men at the door.

"Are James Golden and Professor Emil Schneider here?" asked an elderly, military-looking gentleman.

"I am James Golden," I answered. "Professor Schneider is inside."

"We are the nine members of the local committee to examine apparatus for combating the *Red Ace*. My name is Major Albert F. Ritchey, and I am chairman of the Chicago committee."

"Step right in, gentlemen. Professor Schneider and I will be pleased to show you our device."

The Major entered, followed by his cohorts in single file. I showed them to the room we had set aside for group demonstrations. They took nine chairs and looked at me questioningly.

Professor Schneider appeared about five minutes later. I wheeled out the table on which our smallest "light" or device was set. It was covered with a blue satin cloth. We had agreed that the Professor should talk to them about the *Red Ace* before he showed them the device.

Before the Professor could speak, Major Ritchey stood up with a warning gesture.

"Before you say anything, Professor Schneider," he said, "let me warn you. We have seen and tried many devices during the past few weeks, and have yet to see one that had any real value. We won't waste time here if you can't produce results immediately. We're tired of seeing humbugs."

"Then I assure you before I start, Major, that if you see no more humbugs after you leave here, you have seen your last one."

"Then proceed, Professor. Show us your apparatus."

"First, I must explain the principle. You cannot eat a pie without first being taught.

"I have studied as much about our friend the *Red Ace* as I could. Naturally, all I have had to work on is what I have seen in the newspapers. Allowing for probable inaccuracies, Mr. Golden, junior, and myself have formed a theory of how the *Red Ace* is able to combat every hitherto-known weapon that we have. Be it known, however, that Mr. Golden and myself had started on our experiments on this device"—indicating the table—"before the raider first appeared."

"What do we care for theories, Professor? Come to the point or we shall leave immediately."

"The *Red Ace* comes down for his raids from a height which other human beings have not reached," the Professor continued, ignoring the Major's interruption.

"Professor! Come to the point, I say," shouted the Major. "We have no time for such nonsense. We have only the word of a crazed pilot that the *Ace* comes from any height at all."

A Convincing Demonstration

"I AM sorry, Major," replied the Professor, politely, "if I offend your dignity. I believe Charles Mason. Furthermore, I assure you, Major, your pie will soon be ready for you. You cannot have it, now, for you do not know how to eat it.

"The power our raider has upon people on the ground, planes in the air and rifle bullets seems to me to be easily explained. A certain intense pressure is caused by the *Ace* on an area around it. The size of the area depends on the strength of the sending device. This strength can, I believe, be regulated."

"The point, sir; come to the point! We have no time for such chatter!"

"I am not used to being interrupted in my lectures, Major Ritchey. I must beg you to be patient.

"Mr. Golden, junior, and I have long been working on a device to defy gravity. When we heard of these daring raids, we, also, attempted to duplicate this mysterious force. To our surprise, we succeeded in doing everything the *Ace* has done. Gentlemen, the raiders utilize gravity to get their mysterious power. Then they defy it, to rise unknown distances above the

earth. The same device can be made to do both.

"By his equipment also, the *Ace* is able to remain in one place in the air while it drops the hooks on its loot and carries it away. This power, therefore, is what we must overcome in order to defeat the *Red Ace!*

"I am not going to explain exactly how they get their power, for I do not know. That they use something different from ours is proved by the noise of the giant—they must be giant—engines which furnish their locomotion. But our device too, supplies locomotion without the use of a propeller of any kind.

"Mr. Golden and myself, realizing the power of gravity decided to perfect some method for utilizing it. You have probably heard such theories before. But why could not that power be harnessed and used to raise planes straight into the air, lower them gently to the ground and provide horizontal locomotion as well? It can, gentlemen, and my demonstration will prove it."

He pulled the cover from the table and uncovered a glass bulb about the size of a horse's head, and shaped like an electric light lamp. Inside, it appeared not unlike a radio transmitting tube, an innocent-looking instrument, to say the most. But it was an instrument Professor Schneider and I were proud of. But, like showmen, we had hidden in the next room and inside the table most of the real actuating equipment.

"This, gentlemen, is our device," Schneider announced: "It is capable of lifting a great weight an appreciable distance from the ground, or of pressing it to the earth so that nothing can lift it. It can drive a heavily-laden plane forward at an amazing speed by the mere turn of a switch. Such is the power of gravity."

"Bosh, bunk and hooey! Let us go, gentlemen." Major Ritchey rose and started for the door, followed by his committee.

"I am sorry, gentlemen, but you cannot leave without my permission," the professor warned.

He stepped to the tube, adjusted it slightly, threw in a switch and turned a knob slowly. The nine committeemen were suddenly lifted off their feet and, as one man, rose to the ceiling. A colorless glow shone within our tube. The nine were dumbfounded. Only Schneider and I retained our natural composure and equilibrium. In other words, we kept our feet.

"Now, I hope you gentlemen will allow me to finish my lecture," the professor said. "You are now taking part in a demonstration of the power of gravitational energy, properly controlled. You will see more of it."

The professor turned a knob slowly. The nine surprised committeemen slowly floated back to the floor, where they regained as much composure as about three seconds would allow them. Schneider reversed the switch, the nine fell to the floor and were held there as if tied by ropes.

"When I reversed the switch," the professor explained, "I made the anode in the tube become the cathode and the cathode, the anode by sending current through the tube in the opposite direction. In one case I released you gently from gravity's rule, in fact I repulsed it. In this case, I doubled the gravitational force. And now, friends, are you convinced that we have invented the device that will conquer the *Ace*—or must we demonstrate further?"

Major Ritchey glanced at the others of his group.

"I—I think we've had enough. Will you allow us to rise, please? It's damned uncomfortable on the floor."

"Very well, sir," the professor replied, switching off the current: "Sit down my friends, while I continue my explanation." The nine men slumped into their chairs.

"As I was saying when you attempted to leave, this tube has captured the power of the earth's gravity and chained it to the knobs, handles and switches you see around the device. You turn a knob or push a handle or throw in a switch and you produce a certain desired effect with it. You may do two things at once, and do each one efficiently."

CHAPTER III

An Ultimatum

"PROFESSOR SCHNEIDER," put in the Major, "I am fully convinced of the power of the device you have there, and I think my committee is. Could you give us your plan, please? To some of us your explanation will be pretty deep."

"I am ready for the plans now, Major. I propose that you build another structure at the port to house a tube like this one, only fifteen times its size. When that is done, Mr. Golden and myself will smuggle the tube into the place, connect it with a little auxiliary equipment, and await the *Red Ace!* You will, of course, attract the raider by another gold shipment. If our tube is strong enough, we will bring the plane to earth. If it is not, we will at least learn something of the *Ace's* power, so that we may defeat him in a second or third attempt."

"We will consult our superiors and report, Professor. I am convinced of the power of your instrument. Mr. Golden and yourself have solved a big problem."

"And how soon will we have a decision, Major Ritchey?"

"In a week or ten days."

"Too long. We must know today, as we have other experiments that will keep us too busy, later on, to help you defeat the raider. Our phone is at your disposal."

The major hastened to call his chief. He reached him in Dad's office.

"Major Ritchey speaking, Colonel. These two inventors, Schneider and Golden, have, I believe, what we want. They duplicated several of the feats of the *Red Ace* and wanted to do some he hasn't. But we are quite convinced. They want our answer right away, however, because they have some other work that will keep them busy.—Yes, it does plenty, Colonel.—Right away. They say they won't let us have it unless we take it today.—I don't know. I'll have to ask them."

"Professor," said the Major, cupping his hand over the transmitter, "the Colonel wants to know if you won't wait until tomorrow and he'll be here himself. He'll bring Horace Golden along, too. They're having an important conference right now."

"I'm sorry, Major, but I feel that a prompt acceptance of our device is more important than any conference. Besides, we are to busy to wait. We have waited six weeks. We will not wait a day longer. If you answer today, our work will have to wait. Otherwise it cannot."

"He says he's sorry, Colonel, but there's nothing else to do. You've got to come today. Take a plane if you have to, but come. It's the only real idea I've seen, yet. We can't afford to lose it.—You'll be here in two hours? Just a minute."

"He'll be here in two hours, Professor."

"We'll give him two hours and fifteen minutes to be here or the deal is off," Schneider said peremptorily.

"He says he'll give you two hours and fifteen minutes

to be here or the deal is off.—You'll be here?—Then we'll wait for you."

Colonel William Blakesley had never before been forced into an appointment on the time of anyone else, except a General. You can see, Berry, what a problem the *Red Ace* was. Blakesley would do anything to get rid of him. It seems the Colonel had lost ten thousand dollars in the stock market because of the raids. Most men would get peeved over the loss of ten thousand dollars.

As for Professor Schneider's ultimatum, it was all a bluff. Emil would have fallen on their necks because of the recognition that a successful demonstration of such discovery as ours would bring us. I had spent two weeks convincing him that, by being independent, our recognition would be greater than otherwise. But I couldn't put over a story that he did because I was no actor. Emil was one of the best amateur actors in the state a few years ago, before he and I went into the inventing business. He got these fellows as a cheese gets a mouse. You see, Berry, although other gravity-controlling devices have been in use, they need so much equipment and power that for most purposes they are almost useless. Now we had hit on the ideal solution of man's old problem, just about the time the *Ace* did. We had perfected a portable device to control gravity—to nullify it, to cause it to repulse objects or to intensify its power many times.

Blakesley and Dad arrived twenty minutes early. Dad was grouchy because he had to bow once more to his "worthless son and outlaw Professor," as he called us. Blakesley was hurried; he had visions of getting his ten thousand dollars back. They came in on Dad's private plane.

Professor Schneider again took the platform before the eleven men. I stood beside the table which was once more covered by the satin cloth.

"Gentlemen," he began, "our friend the *Red Ace*—"

"Humph! Whaddyamean friend?" Dad was angrier than I had ever seen him before.

"Our friend, gentlemen. If the *Red Ace* were merely an ordinary raider, he would be merely our enemy. As it is, he is our friend as well. He is a scientific man and must be fought by scientific means. He bids fair to advance our scientific knowledge hundreds of years. So, scientifically, he is our friend."

He repeated his earlier speech from there on. At his word, I pulled the cover off the tube and exposed our device to the examiners. Dad laughed.

"Is that the thing you brought us here for? Are we to see that light lift a paper bag into the air? Huh! I thought you had something to show us."

"We have, Mr. Golden, and you shall see it. In fact, since we must have paper bags and since we have none of our own up here, we shall have to ask you to help us. You must be one of the paper bags."

Major Ritchey leaped to his feet.

"For heaven's sake, Professor! Haven't we done enough experimenting with that thing? These fellows don't want to get mussed up again. Nine of us believe you, anyway."

"True, Major. And you shall be rendered immune from this demonstration. James, the switch."

Ready for the "Ace"

I SWITCHED. I turned a handle and then a knob. Dad and the Colonel were lifted out of their chairs and plastered against the ceiling while the others remained seated. It was a perfect demonstration of the control of gravity.

The subjects of our demonstration were too astonished to talk. Dad's mouth hung open until a fly went in. He spit it out and closed his lips to prevent a recurrence of the disaster. The Colonel was wide-eyed and gasping. It was comical to us. Even Major Ritchie thought so, but he didn't dare laugh.

After we had pressed them to the floor with our ray, we wiped away every objection even Dad had to using our device. They were enthusiastic.

"Why didn't you tell me you had this up your sleeve, son?" Dad asked "I'd never have let you out of my sight if I had known it."

"Dad," I asked him, "why don't you tell your plans to everybody before you are ready to use them?"

"Because our competitors would get them and beat us to them."

"Exactly. You have two competitors. We have thousands. Why would our competitors act any differently than yours?"

"Are you protected with that ray?" put in the Colonel.

"Perfectly. We applied for our patent a day ago," I told him.

"Good! exclaimed my father. "We have things pretty much to ourselves, then, haven't we?"

"We?" I asked him: "Yes, Professor Schneider and myself are well protected. If you wish to be included, you must pay for it."

Dad was never so surprised in all his life. If you remember him, Berry, you know how egotistical he is. He still had ideas about filial loyalty to parents even when parents aren't loyal to their sons. This little jab hurt his pride. We hurt it again, later.

Papers were signed for the use of our device on our own terms. Then we discussed what kind of building we would need for the housing of our device. Rather, Emil and I told them what we wanted. 'Dad conceitedly told us we wouldn't get it. We showed him our agreement saying we would. It was the first time he had ever been blocked in any business deal.

Our plans did not call for a very elaborate building. In fact, we demanded only a temporary wooden structure, well insulated and wired for our convenience. Within two weeks it was finished and ready for our inspection. It was perfect. We O. K.'d it and announced when we would be ready to bring in our tube and other equipment.

About four months had passed since the first appearance of the *Ace*. Nothing had deterred him from his raids. An attempt was made to bomb him from above but, as if sensing the danger, he brought down the bomber and demolished it, causing a great disaster at the field. From then on, such strong-arm methods were tabooed. It must be wits against wits. He became bolder, raiding a Canadian airport (Ottawa) and three more in the United States after the committee visited us. All were daylight affairs. Believe me, he had things his own way.

We moved our big tube in an old beacon box. Dad had planned on getting a new beacon, anyway. We got our tube in without anyone knowing that anything unusual was going on.

The *Sentinel Express* had been re-scheduled to arrive at Chicago at one o'clock in the afternoon from San Francisco. On the day we had chosen for our battle with the *Ace*, it again carried a million dollars in gold. Again Tom Dooley piloted the plane.

By nine o'clock in the morning we had our tube connected and ready for testing. We turned on a little current—enough to lift each other to the roof of the building. Satisfied that everything was in working

order, we were ready for the *Ace*.

Colonel Blakesley and dad came to see us, later on.

"Well, gentlemen, how are you?" dad asked. His tone had changed in the past weeks.

"Excellent, thank you, Mr. Golden," the Professor replied.

"Think you'll get the *Ace*?"

"We'll put full strength on him, Mr. Golden. I will be very much surprised if he gets away."

"That's good. I certainly hope you wreck the brute. He's done enough to us now. Well, son—"

"Are you sure we'll get plenty of power when the *Ace* arrives?" I asked.

"All you asked for, and more, if you need it."

"That is fine," put in the Professor. "Then there is nothing else to do except to recheck everything just before the *Sentinel* gets in."

Lunch was served us in the building. We made our final test on the tube while we ate. Just before one o'clock we were ready.

The *Sentinel* appeared from the west as always, settled down on the field as usual, and the unloading was begun. Schneider and I kept our eyes on the clouds.

We heard the *Ace* before we saw it. Then, coming around from the east, it dropped from the clouds and started toward the field with a rush. As it neared the field, we could see plainly the Aces of Diamonds, the myriad windows and the queerly-built wings. Ah! the wings!

"Emil," I whispered, "why not put the ray on the wing this way and turn her over?"

"I was thinking we might try that, Jimmy. We'll do it."

The Battle

THE two doors opened, and the *Ace* dropped the hooks that were intended to grab the gold. I turned on the switch for our tube; the colorless glow that told us our tube was in operation, appeared, and Emil turned a knob.

The *Ace* swung over on its side, a man dropping out of the door. The plane wobbled and danced about the field, while whoever was inside drew up the hooks and closed the doors. Then we heard the timbers in our little building creak as though under a heavy strain and we felt something heavy pressing down on us. The *Ace* hung more quietly in the air. Its power was overcoming ours.

I turned on more power—all we had. Again the *Ace* began to jump and dance and the pressing stopped. We tried to bring the ship down, but only made it dance more wildly. Again the oppression came over us, the *Ace* hung gently in the air, and the timbers in our building creaked more loudly.

"More power, Jimmy!" called the Professor.

"That's all we have, Emil. The meter on our tube shows it won't take any more."

"Then turn on the melting ray."

I turned a knob and pulled a lever on my side of the tube. The light inside became reddish, gradually fading to a deep pearly white. A part of the *Ace's* nearer wing snapped. The raider dropped on one side, lost one wing and turned over. The ray melted every metal part it could reach.

The *Ace* floundered around until the wing on the other side dropped. It righted itself then, and hung fairly steady above the port. The pressure on our bodies increased, and the timbers of the hut creaked more loudly than before. I turned my knob a little farther; a metal plate on the bottom of the *Ace* melted and fell.

The pressure became almost unbearable. If we could only—! The *Ace* began to move obliquely down toward us, and we could see its entire body straining against our ray. Part after part melted and fell. Had we conquered the *Ace* at last? We heard a cheer from the people outside our building. Professor Schneider smiled.

"We've won, Jimmy," he said.

Ah, Berry, how many of us, feeling the thrill of an expected victory, have gloated too soon! Yet, in spite of all warnings not to count our chickens, we never learn.

The *Ace* was getting nearer to us, shortening the working range of their ray. We felt its power stronger and stronger. Suddenly the roof of our building collapsed, driven by the mighty pressure of the *Ace*. Our tube was powdered, my vision was blinded for a while by the flash as the parts were knocked together. Something heavy fell. We had felt the full power of the *Ace*, released from the opposition of our tube.

I came to, a few minutes later. Dad had me in his arms, thinking I was dead. Big tears were in his eyes. He's a good old dad, sometimes, even though he doesn't like my scientific work until he sees the royalty checks.

I guess Schneider was a little worse off than I; I was only knocked out. He, however, was taken to the hospital for first aid. I was afraid that he had been burned by the flash of the tube. But luckily neither of us were touched.

When the building gave way, the *Ace* rose straight in the air and disappeared above the clouds. It did not even return for the loot. Not a bag of the gold had been taken. So, even in our humble defeat, we had won a glorious victory; for at last the raider had been turned back.

The stock of dad's company began to rise, and business became more stable.

Next, dad called a meeting of the board of directors of the Golden Lines to which Blakesley, Major Ritchey, Schneider and myself were invited to discuss the next step in the battle. Emil and I thought such a conference a waste of valuable time; for we knew what our next step would be and that we could force anyone to agree with us. We held the whip, and could use it as we chose.

Dad's office was chosen for the conference, three days after our first encounter with the *Ace*. It was on the nineteenth floor of the Golden building at Franklin and Madison Streets, Chicago. He surely had a beautiful place, Berry. With white leather and overstuffed chairs in the two reception rooms, comfortable leather chairs for the stenographers, deep-napped Oriental rugs over all the floors, mahogany desks and tables, and the very latest kind of lighting fixtures, it presented itself as a model for de luxe business offices. It did not appear to be the office of a firm on the verge of financial ruin. It was more like the office of the old thirty-per-cent-dividend firm.

After we had assembled in his office Dad came straight to the point.

CHAPTER III

Discussion

"GENTLEMEN," he began, "we owe my son and Professor Schneider a great debt of gratitude for that exhibition the other day. They saved the Golden Air Lines from bankruptcy. Our business, gentlemen, has increased one-third since the encounter

"In view of the success of the first battle Professor Schneider and my son fought against the *Red Ace*, I feel that we must once again turn to them for suggestions, and I believe we should accept those suggestions without question, regardless of expense. They have proved their ability to cope with this problem as no one has. Gentlemen, I, therefore, move that we officially appoint them as a committee with full power to carry on their operations any way they choose."

Boards of Directors are often nuisances when action is necessary. They wrangle over a dollar here and a quarter there until you'd think a dime would bankrupt a concern. This Board just couldn't see things Dad's way. They all had different ideas, and no one wanted to accept anybody else's. Some politely suggested that we "outsiders" retire to permit the Board to carry on its deliberations in secret. But Dad wouldn't hear of it, and eventually had his way. They were like a bunch of quarreling chickens.

The vice-president finally chimed in with a suggestion that would sound logical to almost anyone who didn't know anything about the *Red Ace*.

"Gentlemen," he began, "I believe there is but one way to beat the *Ace*. Put Schneider-Golden ray tubes in every port we have, teach men to operate them, and turn them on the *Ace* at his every appearance along our lines. It chased him away once. It should do it again and again. Cost is no object until the *Ace* quits operations on our lines. I therefore make a formal motion to that effect."

More discussion followed. The directors were like a bunch of old women. You'd think that every man of them was a born scientist. They suggested everything imaginable. Even Colonel Blakesley and Major Ritchey said things now and then. There were ten motions made without a second. It was every man for himself.

I felt sorry for the girl who was taken down the minutes of the meeting. She certainly used lead and paper. I don't see how anyone could write as fast as she did.

Schneider and I remained silent. We sat smiling at the arguments that were flung back and forth before us. It was funny to see old men act as these were. They weren't old enough to be in their second childhood, either.

Finally, Schneider, yawning, rose from his chair and rapped for silence. He got it.

"Gentlemen," he said, slowly, "if you have no pity on Mr. James Golden and myself, at least have some on the poor working girl who is trying to keep up with all of you at once. I notice she is doing a marvelous job of it, considering the chance you are giving her.

"Let me say, gentlemen, that only one man here has given a sensible suggestion. That one is Mr. Horace Golden, your president. And inasmuch as his son, Mr. Golden, Junior, and myself invented the ray, we should be the ones to govern its use. In fact, we put it at your disposal under that condition only.

"I dare say, gentlemen, that only two of us here are scientists. As I have said before, our *Red Ace* is a scientist and it requires scientific knowledge to beat him. Therefore, only James Golden and myself are capable of offering a sane, sound suggestion. Your suggestions are worthless, impracticable, and impossible—mere childish prattle fit for three-year-olds. Unless you acquire a reasonable amount of common sense within the next few minutes, my partner and myself will leave you to fight the *Ace* alone. We await your decision, gentlemen."

I was up before the directors had recovered from their surprise, at being called babies. Berry, thanks to you, I had a great deal to say.

"I will not dignify this group here this afternoon with the title of gentlemen. There are only three gentlemen here: my father, my partner and myself. I can talk more freely than could Professor Schneider, for reasons I prefer to withhold for a few minutes.

"First, I will explain why your vice-president's suggestion cannot be used. Have you any idea how much one of those tubes cost, Mr. Tibley? No, you haven't. They cost $30,000 each. The Golden Air Lines have one hundred ports. That would mean a total manufacturing cost of $3,000,000, besides other necessary expenses, such as buildings, transportation and men to operate them. Obviously, the thing is beyond consideration.

Schneider Explains

"WHEN the committee called on us in Burleigh to examine our tube, we bluffed it into using our tube at once. Since the power of our device has been proved to the world, scientists and other gentlemen of note are clamoring for a sight of us. We have had enough contracts for lecture tours and various other jobs to keep us wealthy for the remainer of our lives even of the vast economic value of our device is overlooked.

"We can, therefore, afford to be independent. We can leave your line to the mercy of the *Red Ace*—and he has proved he has none—and never worry about it. I can and will take care of my father if we are forced to end our service with you. Besides, how much of Golden stock do you own, Dad?"

"Twenty-nine per cent."

"I own twelve per cent. That makes forty-one per cent. You'll stick by anything I do, won't you, Dad?"

"I surely will, son."

"Then I will assure you directors that children cannot run the Golden Air Lines in this crisis. I have a proxy, signed by Bernard M. Jantzen, for ten per cent, or the controlling interest of this company. You, therefore, will listen to what Professor Schneider and I have to say. You are unable to do otherwise."

They knew it.

I want to tell you now, Berry, how glad I am that your letter got here in time for me to use your proxy. That ten per cent, you have saved a great deal of time. Without it, the ultimate defeat of the *Red Ace* would have been postponed indefinitely.

"Since I know more about flying than Professor Schneider, I will explain the plan we wish to follow. After the escape of the *Ace* and the smashing of our apparatus the other day, we decided on a further plan of action. We are positive that we now have one that will finally conquer the Ace.

"The *Red Ace* comes upon us from the air. We then, must, go into the air to attack him."

Major Ritchey smiled pityingly on me as he answered my remark.

"My dear sir, we have already tried that method. Nine of our planes crashed under the mysterious power and the tenth was helpless against it. You would do well to inform yourself of all details before you endeavor to plan."

"Major," I answered, "I thought my partner and I taught you enough in our laboratory. Well, I know of the fate of your ten planes. What kind of planes were they?"

"Rand-Burfess. The finest planes ever made, piloted

by the best fliers in the service, and maintained by expert mechanics."

"Have you ever heard of a Schneider-Golden plane?"

"Uh-no, why?"

"The most wonderful plane in the world, Major. Capable of soaring as high as the limits of space, if the parts of the plane are made to stand it. No propeller, engine or wings. Speed hitherto impossible. Truly a marvelous plane, Major. Conceived only two months ago; still in the embryo stage. Still having the plans drawn.

"Motive power, lifting power, offense and defense, controlled by the Schneider-Golden ray tube. The main tube will be housed on the ground in some building suitable for it, and will be maintained and operated by an attendant trained for the purpose. A duplicate tube with all its own control apparatus will be placed in the plane itself. While near the ground, rays emanating from the main tube on the ground will be received by the tube in the plane. Some of these rays will be used for the control, some for signaling the operator of the main tube, and all others—by far the greater part—will be used by the duplicate tube in its operations. The device will eliminate all mechanism from the plane and will reduce the weight of the ship. We have taken into consideration the possibilities of the failure of one or both of the tubes and have a safety device for landing the plane. If we have to get away from the earth, the tube in the plane itself will suffice.

"Everything is in readiness to produce such a plane as soon as the draftsmen complete the drawings. The control of the line's stock insures the completion of the venture. I thank you for your kind attention."

You'd be surprised how enthusiastic they were about the plan. One director proposed that a fleet of these planes be built and put in use by the lines on regular duty. At this suggestion, Professor Schneider rose.

"My friend," said he, "I appreciate your enthusiasm in this matter. I assure you that when certain matters are attended to, the Golden Air Lines, as well as the United States Goverment, will be at liberty to use a fleet of these planes. First, however, I want you to understand that the principle to be employed in the operation of the new plane has never been thoroughly demonstrated. We must build one plane first, and try it to see that everything is in perfect condition; and if not, make improvements. If a fleet were made immediately and any changes were required, the expense would be too great. We must all be patient."

The statement satisfied the directors. Colonel Blakesley had ideas about the principle of the plane itself, however, that needed airing.

"How can anything stay in the air without wings?" asked Blakesley, sarcastically.

"How did the *Red Ace* stay in the air after the wings dropped off? How did you stay plastered against the roof of our demonstration room?" "I answered, in my most sarcastic manner.

He was silent.

The plane was built according to our plans. Believe me, it was a dandy, but looked about as much like what it was as I do.

On the outside, it looked like an oval block of steel cut horizontally across the top and bottom, pointed at each end, and studded with windows. It was seventy-five feet long, twenty feet high, and fifteen feet across the middle. There were no propellers, motors, exhaust, nor rudder. It was just an object—nothing more nor less. You couldn't even tell which was the front end and which the rear. In fact, there was no front or rear.

Following the Ace

INSIDE, it looked like a chemical laboratory. Our tube with all its control apparatus was at one end of the plane. A fan-like contraption, as Dad called it, was at one side of the tube to serve as an aerial to catch the emanations from the main tube. Oxygen tanks for use in rare atmosphere were placed along the walls, and so connected that the man controlling the tube could turn a valve, and one tank at a time would empty its contents into the plane. As soon as one was empty, the next one would start automatically. (Three walls adjusted by a vacuum insured protection against the cold space). Aside from that, we had guns and ammunition of many kinds in case we met the *Ace* and had to shoot. That was our equipment, even for our test flights, in the event we saw the *Ace* unexpectedly.

We even made up a special safety device. It was controlled by a little arm, and attuned to earth's gravity. Even tho no one in the ship were conscious at the time the tubes went out, if they did go out, this arm would be released from the locking position, and gravity would pull it toward the earth. This happened whether the ship was right side up, upside down, on one side, or on end in relation to the earth's surface. That also actuated a set of adjustable rocket tubes, with which the plane was equipped, and set them in positions most suitable for effecting a landing on the earth. Rockets were then set off automatically to propel the ship down to a safe landing somewhere, unaided by manual means. We didn't need this aid but, if we had, it would have helped us a great deal. We tried it experimentally and it worked every time.

All that time, the *Red Ace* had been quiet. We heard that a plane like it had been laid up for repairs in the mountains in Colorado, but the rumor was never verified. Government planes searched the country in vain for a sign of it. It seems that mechanics were kidnapped from somewhere in the west and forced to repair the ship. We know that these mechanics returned to their homes two days before the next raid and were unable to identify the location of the bandit's base.

Then we heard of a raid the *Ace* was making on the St. Louis port. The "Chicago Express," carrying important mail from Kansas City and due at three o'clock, was the victim. At one minute past three the radio operator at the Chicago port received a message that the raider was coming.

We turned on our tubes, and prepared our plane. Mason, who had recovered from his tragic experience, came with us, as well as Dad and Colonel Blakesley. We were soon ready to start.

Naturally, we didn't get to St. Louis in time to stop the raid. We made the distance (259 miles by air) in less than forty minutes without anything like full speed. When we were over St. Louis, we turned on our radio and talked to the port.

"Which way did the raider go?" asked Schneider.

"Straight up," came the answer: "Straight up until we couldn't see it anymore."

"Then straight up we go," announced the professor, turning a knob.

And up we went.

We found no trace of the raider, although we went up 264,000 feet (fifty miles). We flew around for miles in every direction, but in vain.

"Are there any other important shipments coming in

soon, Dad?" I asked.

"Yes, Denver, Colorado, is going to have one at five o'clock."

"The *Ace* may make a try at that. We'd better move over there, Emil," I suggested.

"What?"—asked Blakesley. "Don't speak preposterously at a time like this, young man. A raid at three o'clock at St. Louis, and at five in Denver? The distance is 793 air miles. That's impossible for a heavy ship. Even your marvelous climber couldn't do that."

"Well, it's four o'clock, now. In a test, we had our plane going at eight hundred miles an hour without letting it out at full speed. At that rate we can be at Denver at five o'clock. If the raider does try Denver and we miss him, we should intercept him before he gets far away. He takes ten minutes for a raid. So, even if we lose a few minutes, we should get there before he has finished."

"You can't go so fast. Nothing so heavy can," insisted Blakesley. Blakesley, you understand, couldn't get out of his mind that this was not a gasoline engine, screw propeller plane.

"We can try it, anyway," I said.

The Professor stepped to our tube-control apparatus and pulled a lever toward him, until our speed gauge read 800 miles an hour. Blakesley's eyes bulged.

"Such," I said to him, "is the power of gravitation."

Funny thing about this gravitation business, Berry.

It's so powerful you can do almost anything with it, but you can't find out just how you do it. I mean exactly how you do it. If you use a certain kind of material in the tube and turn on enough electricity, you get your power. Of course, I can't tell you the kind of materials to use, because somebody else might get hold of this letter.

Well, we reached Denver and started down, watching for our *Ace*. I think Mason was looking hardest because he had a personal score against the raider—that mechanic who died was a good friend of his.

We were below the clouds when we caught sight of the plane. It had no wings, this time. Its red back was turned toward us as it gathered in its last bag or two. Our clock pointed to nine and a half minutes after five, Mountain time.

CHAPTER IV

To the Moon!

I TURNED the tube on the raider's nose, and nearly turned it over. It swerved to the side and then started straight up. I turned on the ray again and pushed the raider down. Then it was beside us and going straight up.

At Schneider's order, Mason and Blakesley grabbed machine guns and put them on stands on the side of our craft nearest the *Ace*. We opened a little peep hole for each gun, pushed the muzzles through, and clamped them in place with movable air-tight clamps which allowed the guns to be moved, but allowed nothing to come in, or escape.

Mason's gun was ready first, and he sent a rain of bullets at the raider. The tube neutralized the pirate's pressure and allowed the shots to hit their mark, but they did no damage. They could not pierce the tough sides of the raiding ship.

Our altimeter showed we were rising at an almost unbelievable pace. As we rose, the atmosphere became lighter, the resistance it offered grew less, and our speed increased.

We could see people moving in the *Ace*. There must have been at least a dozen men in the ship. I caught a glimpse of a girl and, utterly surprised at this, radioed Denver.

"What did the *Ace* get?" I asked.

"Important papers and money. They also took Miss Betty Parsons, daughter of Charles S. Parsons, millionaire New Yorker. They left a note saying that, if Mr. Parsons sent a million dollars to the *Ace* via the Golden Air Lines, she would be returned. It was signed, 'Carson of the Moon.' Miss Parsons was a passenger on one of the Golden planes."

"Thanks," I called back.

"What do you make of that, Jimmy?" asked Dad.

"Well, Dad, the only moon I know anything about is the one that lights things up on our earth at night. If this note means the raiders have a base on the moon, we have quite a little journey ahead of us, tonight. The moon is 238,851 miles from the earth."

"By George!" exclaimed Mason: "We may see a few things tonight."

"We should," agreed Schneider, "see many things."

"Since we evidently have to go some distance, and since Miss Parsons is now a prisoner on our opponent's conveyance, and since we must get the owners of that great raiding machine, I suggest we confine our efforts to sight-seeing and to following the *Ace*. We must not risk anything, you know."

Blakesley just couldn't get things straight.

"We go to the moon? Miss Parsons on that plane? Preposterous! Impossible! Things like that just don't happen in life."

"There are five lives in this plane, Colonel, and how many are in yonder contraption somebody may know, but we don't. It is happening in all of those lives, Colonel. But it certainly appears that we are headed for the moon."

At my words, the others looked ahead of us. The moon was directly in front, the earth behind; and the *Ace* still only a few miles off to the side, and ahead.

"I rather feel," said Professor Schneider, "that the *Ace* counts on reinforcements when he reaches his base. He has made no effort to drive us away nor to get away from us. So far as his notice is concerned, we might be a million miles away. He pays no attention to us whatever."

Nor did he. With lights out, but well within the range of our own spot (supplied by the tube), the raider flew on. We were well beyond the limit of recording our altimeter, so we had no real knowledge of our height above the earth.

The ride was almost monotonous. We could see the earth gradually receding from us and the moon drawing nearer. We did nothing but look at each other, at the moon and at the earth; or say something, or maybe yawn once in a while. The earth began to appear like a distant mysterious object, gradually growing smaller and more mysterious. North and South America and the oceans were dimly illuminated with the light of a full moon. That moon became a close dead thing, gradually becoming larger and larger. Bright with the light of the sun, it looked hideous with its volcanoes, canyons and lifeless plains. Could anyone live there?

The question must have been in everyone's mind. Dad finally blurted it out.

"It is remarkable that anyone could," he said.

"It is remarkable that anyone could, Mr. Golden," echoed Professor Schneider "In fact.. .. .."

"In fact it's damn foolishness to say there ever could

have been anyone on the thing," interrupted the Colonel.

"In fact, it's really surprising how many ignoramuses there are in the world," remarked the Professor. "What I was going to say before this—ah—unexpected interruption by the laity of our expedition, was that, until now, it was unbelievable. Now, however, nothing is impossible. Gravity nullification, wingless planes, and all the other scientific so-called wonders were impossible until someone discovered they were not. Life is always like that!"

To the Moon

AS you travel between them, Berry, you certainly appreciate the difference in the size of the earth and the moon. I never paid any attention to astronomy until we took that trip. But I learned that the earth is about four times the diameter of the moon. Did you know that? To be exact, the earth is 7,914 miles in diameter and the moon is 2,160 miles. Professor Schneider told me all that while we were going up.

We had an electric thermometer on the outside of our plane that registered the temperature on a chart next to our tube. As we neared the lighted side of the moon (at this time the side that was always toward the earth the thermometer showed 215 degrees Fahrenheit—three degrees above the boiling point of water! We followed the *Ace* around to the dark side of the moon and our thermometer dropped like a boulder down the side of a cliff. When the sun was completely hidden by the moon, our meter read 230 *degrees Fahrenheit below zero!* A few minutes later it dropped ten degrees more. There is a reason for that, Berry, but I haven't room to tell you, just now. And it was only our electric heating devices and heat-insulated walls that kept us from freezing solid.

On the "blind side" of the moon (the side away from the sun,) we could see evidences of former small bodies of water, and of one large ocean. Dead volcanoes studded the land parts, as on the other side. It must have been a great body at one time.

We could see the ruins of former habitations, now lifeless millions—perhaps hundreds of millions of years. We were not close enough to see what they were made of. But I believe that, if we had landed, we would have found the evidences of a once marvelous civilization.

"Carson of the Moon" had chosen the crater of the largest volcano on the "blind" side as his headquarters. There were several buildings there that appeared to house some mechanical or chemical equipment, probably to create enough atmosphere to permit them living inside. One of the buildings had been left open. It looked like the hangar for the *Ace*.

The raider turned its nose downward toward the volcano. One man, clothed like an Eskimo—only more so—and with his face covered by a gas mask, or something similar, opened a small door in the nose of the plane. He tossed a red flare to the ground below and closed the door again. Immediately the cold moon became alive again, at least inside the crater.

Men, dressed in odd-looking uniforms of fur and masks, rushed out of the buildings to guide the *Ace* to its hangar. There was a small army of men there, uncoiling ropes and preparing to fasten them to the big machine as it settled within their reach.

I stepped to the tube and lowered our plane. Suddenly our machine gave a leap and went away from the moon like a shot. The base had given us all the power they had to keep us from bothering them. All, except Emil and myself, became panic-stricken. The three passengers rushed about the place, ordering us to capture the villains, get back the money, rescue the girl and save the Golden Air Lines.

"Turn on the melting ray to its first step," Professor Schneider said, calmly.

I did. He guided the ray to first one and then other of the buildings below us until we felt a cessation of the power which had driven us away.

"Second step," he ordered.

The plane stopped rising and began to drift slowly back toward the moon.

"Third step."

The plane went a little faster.

"Full power, quickly. Their apparatus is melting."

He had focused the ray on one building at a time until he had found the one that housed their gravity device. As we increased our power, we must have heated their machine so intensely, that we finally melted parts of it. At full power, the machine caved in and flowed away like water. They had no protection against our melting ray. Then we turned it on the *Red Ace* itself now projecting half way from the hangar and its parts ran like water.

As we neared the base once more, the workers became panicky. As fast as they could, in their heavy clothes, they ran hither and thither like a flock of cattle. One opened the door of their gravity house and was caught by the flood of melted metal from their machine. He died instantly. I don't believe he knew what hit him.

Long before we had left the earth, the professor and I had a faint idea that we would be exposed to extremely cold temperatures and had, accordingly, devised clothing that would withstand it. They were made of hinged metal into which we had forced compressed air. The metal was covered by a heavy coat of fur. It was so arranged that, so long as the suit was on, oxygen would be constantly supplied to the body. We had masks for our faces, with a tube connecting with the main tank in the suit to supply air through the nose. There was enough oxygen in the tanks for five or six hours. The person wearing the uniform was warmed by emanations from the tube in the plane.

I got out two of these suits.

"Now," I said, "we begin our fight. One of us must stay here to operate the tube. That should be Professor Schneider. Two of us must watch for any attacks on our ship by the raiders, and report them to Professor Schneider. Two others will be free to carry the fight to the raiders themselves. Dad and Colonel Blakesley, being older and holding more important positions than Mason and I, must not risk their lives outside of the ship. It's up to Mason and myself."

"But you are a great inventor. The world needs you, boy," Blakesley said suddenly solicitous.

"Professor Schneider can carry on alone if anything happens to me," I answered: "Besides, with our ray, I hardly think anything can happen."

When Mason and I had donned our suits, I explained the operation of the signal system we had installed in the suits.

"Emanations from this tube in the plane will always reach a control button in the suit. This button is in front of the left armpit. To signal the Professor, push the button and turn it to the right. That closes a circuit, turn the button to the left and release. I think we had better leave the circuit closed, so that we can report progress continually without bothering to turn the switch."

"I do, too," assented Mason, eagerly. I have seen

few men more eager to risk death than that young pilot.

"Then we'll do that."

We turned our control button and put on our masks. The plane landed on the moon, next to the demolished *Ace* itself. The Professor turned the ray on the door to keep the bitter cold out while we stepped outside.

Betty Parsons, dressed in clothes similar to those the men were wearing, had been taken into the building nearest the "gravity house." Mason and I walked toward that building in full view of the raiders, we merely turned the ray on them as they attempted to shoot us.

The door of the building was unlocked, as though the raiders wanted us to go in there. I opened the door and entered. We found ourselves in a trap. Six men were standing near the opposite wall when we entered. The door locked behind us automatically and we found ourselves facing six automatic pistols. I spoke, their pistols clattered to the floor and the men dropped. Schneider certainly had things under perfect control.

I spoke to the Professor again, and the door the six had been guarding against us blew inward, revealing a beautifully ornamented and tapestried throne room. On the throne itself, dressed in silk, sat an old, decrepit man. Beside him stood a much younger man with a hard face. Before them, evidently forced to the floor, knelt the girl we sought. She looked at us hopefully, yet fearfully. The two men stepped before us as we entered.

"Stop where you are. You dare advance no farther," one of them warned.

"We dare come as far as we like," I answered, taking my mask off, but holding it close to my mouth so that Emil could hear what was being said.

"If you do, you will be shot down in your tracks."

"If you attempt such a thing, I feel sorry for every one here, except the girl you took at Denver."

The other laughed.

"You were lucky to land here. Our gravity ray failed for the first time. It is being repaired. When it is finished, you will leave here at our will."

"Your ray is beyond repair. No, my dear sirs, you are at our mercy. You have shown us you have none. We will show you we have none. You had best surrender and save yourselves the trouble of finding it out."

"Like to brag, don't you? Just because you're the only ones that have beaten us before is no sign you will continue doing so. We have men besides our scientific power."

"You will be surprised when you find you have only men."

"You shall see," said the man on the throne. "Paul, turn on the ray."

The man beside the throne spoke into a tube behind the throne. He listened for an answer, and his face paled.

"Begging your pardon, sir, but the men in the gravity room say the ray is demolished. It is but a mass of melted iron," he reported.

"Then shoot these men down," screamed the old man on the throne. He raved and howled like a maniac.

The two guards drew pistols and aimed at us. I spoke into the mouthpiece in my mask. Mason, his mask off, now, looked at me for orders. Our tube had lost its strength through a failure of the main tube! That was what Emil told me as these men stood there, ready to shoot us down like the helpless individuals we were. The Professor's voice faded as he spoke to me, finally dying out with the strength of the tube.

I fired twice with my own revolver, bringing down two men. Mason fired once and got two with the same bullet. We ducked behind a heavy chair nearby just as the raiders fired. One bullet hit Mason in the shoulder, but it only took off some of the fur. And there started the first battle the moon had witnessed since the wars of an age long dead.

It didn't last long. The power was off in the tube about three minutes; then it came back and swept the throne room clear of men, throwing those who still lived against the wall with a force that killed them. Only Miss Parsons, the maniac leader, and the man at his side remained.

We made them dress in the uniforms that protected them from the climate on the moon. The five of us returned to our plane where we tied up the two men.

I turned the switch on our tube and the plane began to rise. Once up, I turned it along the moon, to go around to the opposite side, where the earth would be.

Then, gradually, forcing out the words from out captives I learned the story.

The maniac leader—"Carson of the Moon" as he signed himself—had discovered a way of defying gravity, Berry. He had discovered the very nature of gravity itself and had produced it artificially. However, he had not learned to control it for the locomotion of planes. Therefore, his craft had to use engines which sucked the air from in front of the *Ace* and pushed it out behind, forming a suction which pulled the plane forward, and rockets for use beyond the earth's atmosphere.

Exactly what Carson discovered may never be known. He is in an insane asylum—a very bad case. The only other man who knew his secret was the one who was killed by the melted machine when he opened the door of the gravity house before we landed. His death prevented the installation and operation of a second gravity machine; but sealed forever the lips that could give us the answer we sought.

The other man we took knows something, I believe, but he won't tell anything, and the law isn't interested in science and won't help us. We could force him if he ever could get out of prison, but he's serving a life sentence on several counts, among them being larceny and kidnaping.

Miss Parsons is safe, as is the loot that was taken with her. The Schneider-Golden-ray Tube Co. is soon to begin operations; our job being the simple task of revolutionizing the world.

Hope I didn't tire you out, Berry, but I have told you just what happened during those dark days. You know the rest.

Your friend,
Jim Golden.

P S.—Dad wanted to call our new company the "Paper Bag Corporation" but we quickly overruled him on that.—J.G.

THE END.

(Illustration by Ruger)

Frantically they fought with the controls. Too late! A blinding flash—a terrific impact—a deafening report within the car. A meteorite had torn a large section of the nose away.

"LOOK here, Dave! What do you make of this?" Captain Val Cameron of the Inter-Stellar Patrol called to his subordinate as he gazed into the radio-vision screen before him.

Lieutenant Dave Driscoll stepped quickly to the tall Captain's side. Chief Machinist Jeff Anderson looked up from his station at the engine room door, where he carefully nursed the great electrically controlled rocket motors that sent the patrol ship flying meteor-like through the heavens.

Driscoll peered at the image that his Captain had indicated. On the screen was a green-looking craft, different from anything the officers had ever seen. And further it appeared that the stranger was displaying no identification marks or lettering.

JIM VANNY

And then as the two men gazed at the strange ship it seemed as though a mist would momentarily obscure it to the view. With deft fingers the Captain would adjust the dials of the radio-vision to get a new focus.

"There it is again," he said as the stranger came once more into view. "Increase your shots. I may want more speed than the present adjustment will deliver."

"Aye, sir," replied Anderson.

The air patrol Captain turned his attention now to the task of overhauling the stranger. That he could do so, he had no doubt. These patrol ships were the fleetest ships of the sky, distancing by far the Inter-Stellar liners whose routes they patrolled. And their cruising range was as great as their speed.

Ten years of successful operation had given the Inter-Stellar Patrol the reputation as veritable hawks of the ether. From them none of the prowling pirates of space might hope to escape.

The image in the vision drew nearer. But Captain Cameron was due for an embarrassing surprise. For even as he began to overhaul the stranger, it drew away from the *Raven*. But Cameron had noticed a thing that caused him to open his eyes in amazement.

"Keep your eye on him, Driscoll," he advised. "And be ready with the ray guns. There is something wrong with this bird. I can't make out how the thing goes. He hasn't a rocket going."

ONE of the greatest obstacles to travel through interplanetary space will undoubtedly be the danger from meteors.

The problem is especially acute because of our almost total lack of knowledge about these numberless spacial travelers. True, we know that they exist, but the laws that govern their being, their prevalence in certain areas, or at certain times of the year, their speed in space, are among the things of which we have little knowledge. And it is questionable whether we will get any until we are really able to penetrate our atmospheric envelope and get out into space to study them.

We have even no certainty as to where meteors originate. Some scientists believe that they are the remains of exploded planets; others believe that they originate from comets from which they have been parted by one force or another; and still others think that they are the result of the disintegration of small planetoids. But it is sufficient to say that they are one of the great enigmas of space. How important a factor they may be in all interplanetary travel, Mr. Vanny shows very eloquently in the present story.

We are sure you will all enjoy it.

A Pursuit Through Space

His left hand gripped the speed control and the dial swung from thirty thousand up gradually to forty thousand miles per hour. Still the stranger maintained his distance. Forty-five thousand, fifty thousand—Cameron's grim face became lined with anxiety.

"He is the toughest bird we've met in some time," he murmured to Driscoll as the latter stood at his side. The lieutenant nodded.

"I'm afraid he's playing with us. If we could only get within range—"

"We're almost to our speed limit in this zone, sir," called Jeff as the fifty-five thousand mile mark was registered.

And indeed, they were approaching nearer and nearer to the earth so that now such terrific speeds became dangerous.

Cameron's hand went to the control once more. The speed dial dropped slowly until finally it was back to twenty thousand miles an hour. The stranger had become a speck in the distance.

"It isn't any use burning her up," was Cameron's grim comment. "The radio, Driscoll. Broadcast this fellow."

Before ten minutes had passed the great radio stations at Long Island, Melbourne, Berlin and Tokio had received warnings of the strange air vessel. The short wavelengths penetrated the Heaviside Layer. And fifteen minutes after Driscoll had signed off, the entire Inter-Stellar Patrol of the earth had been informed to keep watch for the strange visitor.

"What do you make of it, Cap?" asked Driscoll as he relieved Cameron at the controls.

The Captain of the *Raven* shook his head

"T h e r e ' s something afoot," he replied. "I only know I'll feel easier when the *Martian* is safe in port."

"The *Martian*? Oh, yes. I'd forgotten that your wife is aboard her."

Val nodded.

"Yes, Dave. Myrna is coming on the *Martian*. And she is still more than three days from the Earth. They are overdue now, on account of the meteoric shower they've been dodging—or trying to. It's been a tough trip."

Driscoll could fully understand the Captain's anxiety for his young wife. Myrna's trip to Mars had been her first away from her home planet. But when Phil Darling, her brother, and one of the leading antique dealers of the twenty-sixth century found it necessary to visit Mars both he and Val had decided that it was an excellent opportunity for Myrna to see the Red Planet.

And now, after a month's stay they were once more headed Earthward on what was turning out to be an

extremely hazardous trip.

But at the time Val's anxiety for Myrna's safety was not based alone on the strange actions of the mysterious airman who had outrun the *Raven*. For the past five years the reputation of the Inter-Stellar Patrol had made air raiding unprofitable.

A half hour later the *Raven* slowly entered the earth's atmospheric envelope and started its long glide down to the surface. Cameron's eyes were once more riveted on his dials. As Driscoll followed his Captain's glance he whistled.

"Barometer's falling well," he said. "We'll probably get into a storm before we get berthed."

"Falling fast, too," muttered Cameron.

Heavy clouds enveloped the night-shrouded earth as the *Raven* drew nearer to the surface. It seemed to the crew that they were really aboard a submarine of the sky as it plunged from cloud layer to cloud layer.

Frequent lights scudding by them told that many other craft were abroad pursuing their trade routes at the fifty-mile level.

The giant lights of the platform gradually became visible below them. I say platform because that was what it was termed. But in reality it was a regular elevated air terminal. Here on the Inter-Stellar platform hundreds of feet above the ground were located the stations, shops, restaurants and in fact everything related to a great transportation terminal. Access to the city below was gained by high speed elevators.

CHAPTER II
Bad News

SLOWLY braking the descent of the ship by explosions on the nose, Cameron brought the patrol ship to rest. Now she would go to the repair shops for a thorough inspection before being pressed into service again. And the crew would get a much-needed rest in the meanwhile. For even with the wonderful ships of this day, a month's patrol duty in the silence of outer space was no child's play.

The first duty of the captain of the *Raven* was to make his report. Then, for an hour he and Driscoll leisurely ate an excellent dinner at the Inter-Stellar Hotel. At the end of this time, they arose and strolled across the platform toward the officers' quarters. Their walk took them past the radio operator's room. Cameron meant to inquire for the latest news from the *Martian*. As they reached the door, they heard the sound of loud voices.

"Get Commander Reed at once," the chief operator was speaking excitedly into the local phone. He hung up the receiver with a bang and then perceived the officers.

"Listen, Cameron," he said as if to prepare him. "We've just heard from the *Martian!*"

"The *Martian!*" cried Cameron. "I knew it! What is it?"

"The *Martian* has been struck by a small meteorite and disabled," the operator said slowly. "Her tanks have been damaged and her oxygen supply is gradually escaping. She's drifting helplessly in space and has called for aid!"

Ten minutes after the operator's startling announcement, Commander Reed of the Inter-Stellar Lines arrived on the platform. It needed just a moment for him to decide on action. And a glance toward Cameron's anxious face solved all doubt as to what that action should be. "Want to try it, Val?" he said.

"You bet," Cameron responded.

"Then take the *Swan*, Cameron," said Reed. "It is larger and faster than the *Raven* and is easily controlled. I shall see personally that everything is in readiness for an early start with a fresh crew. In the meantime, you and Driscoll get some rest."

"But, sir—"

Reed shook his head determinedly.

"No, Cameron. You cannot start before morning. You need rest. Besides, the *Martian* told us she has enough oxygen for nearly two hundred hours. You can easily reach her by then. If not, she has her life tubes. And her radio is working constantly."

So Cameron, followed by Driscoll reluctantly turned toward their quarters. But for the captain thinking of his young wife terrified, perhaps, by the misadventure of her first trip into space, there was little sleep. So with the first rosy streaks of dawn, he was astir and ready for the great adventure. Hundreds of thousands of miles beyond the earth, drifting helplessly about in the emptiness of space, floated a shipload of fellow Earthmen, among them his beautiful wife.

Commander Reed had been as good as his word. He had gathered a picked crew and when Cameron, Driscoll and engineer Anderson arrived on the platform at dawn, they found the graceful, silver *Swan* provisioned, conditioned and in readiness for her errand of mercy.

They lost little time in getting under way. In a short time Anderson had the machinery humming and soon with the deep roar of the rockets sounding they were rising above the platform. And in a few minutes more, the Earth was lost in the dim haze of rosy light enveloping it.

"It's going to be a tough old hunt," remarked Anderson as he stood at his customary post in the doorway after the ship was well under way.

"Very," was Driscoll's comment.

Captain Cameron said nothing. His face set in grim lines. This was not by a long shot his first search thru the vastness of the heavens for a tiny speck. But now the search was for something that meant his whole life to him—Myrna. And it was not until thirty-six hours had passed that communication with the *Martian* was established. The disabled liner stated the number of her passengers and crew and her position.

Then suddenly, as the operator of the *Martian* was describing their predicament, communication ceased. Desperately the *Swan* tried to establish communication with the *Martian*. But there was no answer. The radio of the derelict seemed to have abruptly stopped, gone out of commission.

By calculation, Cameron knew that the *Martian* was three hundred thousand miles away. And putting all the power behind the *Swan* the distance was covered in six hours.

But vainly the searchers combed the heavens for the missing ship. Hours passed into days. And finally, by their clock, the captain of the *Swan* realized that he had been searching for a whole week.

"She's been picked up by another liner and towed back to Mars," was the Lieutenant's hopeful conclusion one day.

The *Martian* Found

CAMERON shook his head gloomily.

"Then why weren't we advised by radio?"

"Maybe the rescuer's radio went dead."

"I don't believe it."

Driscoll said nothing.

Privately he agreed with the Captain.

Another day passed. It was just before the change of

the watch; Cameron was on duty. Driscoll was resting easily in his bunk when the phone rang. It was Captain Cameron's voice, tense, eager.

"Dave! Come here quick!"

Rising quickly Driscoll went immediately to the control room.

Cameron was staring intently at the radio-screen set into the wall.

"Look!"

The Captain was pointing to the screen. There, clearly defined, lay the *Martian*. It seemed to be lying helplessly in the black starlit heavens.

"How far?" questioned Driscoll. The Captain studied the guide.

"Four thousand miles," he replied. "Highest frequency, Jeff," he called to the engine room.

"Aye, aye, sir," came the operator's reply, "I'll have the old tub alongside the *Martian* in less than ten minutes.

And it was no idle boast. Scarcely had the allotted time elapsed when the *Swan* lay in position to grapple and board the derelict.

That she was deserted there was not the slightest doubt. There was not the least sign of life about her. Yet were the passengers and crew aboard her—dead? What about the tell-tale life tubes? Quickly examining the sides of the big ship, Captain Val Cameron noted the empty pockets. Then the ship was abandoned! They had taken to the tubes.

But the life tubes were risky in the meteor-infested heavens at this time of the year. Although equipped like the mother ship, they were not nearly so strong and their ability to maneuver out of the onrushing meteor cluster was questionable. A hasty examination showed Cameron that the stern of the *Martian* had been damaged considerably more than her messages had intimated and that three life tubes had been smashed in the impact. Too many! The rest of them must be crowded. He sincerely hoped that the travellers had been picked up by this time. They must have been adrift for a long time.

With Jeff Anderson managing the *Swan*, Cameron and Driscoll after grappling and putting on space suits prepared to examine the derelict. Passing through the boarding chambers of the two ships the men found themselves in the engine room of the *Martian*.

From room to room—the control room, salon, dining room, state-rooms, crews' quarters and mail compartments they went. There was not a sign of life.

The Diary

AND just then Driscoll grasped his Captain's arm and motioned him forward. Val followed wondering. In a little companionway near the nose of the huge ship they came upon it. The steward's body lay crumpled in an inert heap on the floor. Cameron bent over and made a hasty examination. The distorted features and bulging eyes told their own story of the agonies of strangulation.

Why was this man still aboard the derelict? Why had he not gone with the others? Unable to answer these riddles the Captain and Lieutenant removed the man's body to a stateroom on board the *Swan*. And as they lifted him a small leather-bound book lay beneath him.

Val picked it up and thrust it into his pocket.

"Cast off!" were his first orders after they were once more again in their own ship and the suits removed. Then the message was sent to the station on earth so that a towing ship should come out to bring the liner back to earth. "And now to see what this volume contains."

"Looks like a diary," said Driscoll, observing the book. "Some people still keep them although it has grown to be quite an ancient custom."

And a diary it proved to be. Quickly Cameron turned to the date that indicated the first day of the mishap to the *Martian*.

> "Struck by a meteorite! Thank God! It was a small one. As it is, it has paralyzed everything but our emergency radio set. Lucky it was not worse. We have been dodging the meteors for days. . . .
>
> "Captain Billings has sent an S O S and is in touch with Long Island. It seems we are only three days from the Earth, so we should be picked up soon. . . .
>
> "Oxygen tanks number 2, 6, 8 and 9 have been injured and are almost empty. But the other ten tanks seem tight. Have lost three life tubes in the crash. Hope we will not need them. . . .
>
> "We have been drifting for three days now. Are in touch with the *Swan* sent from Long Island to assist us. She seems to have difficulty in getting our bearings. . . .
>
> "The emergency radio set has gone bad. We no longer have word from the *Swan*. Can they find us? . . .
>
> "The passengers are becoming restless and there is some talk of taking to the tubes. For myself, I favor the old *Martian*. She is quite solid yet. . . .
>
> "They have decided to abandon ship. But I shall not leave. If they prefer those flimsy tubes at this time of the year, they are welcome. Not for me. . . .
>
> "Well, I have been alone for three days now. It is terribly lonely, but I hope that soon I shall be picked up. There is much food and I am comfortable. . . .
>
> "I am afraid I have made a mistake! It is becoming difficult to breathe! Have I misjudged the oxygen capacity? Or has time passed more swiftly than I thought? . . .
>
> "It is stifling now. I fear the end is near. I should have gone with the others. . . ."

The sentence trailed off in a scrawl and the crew of the *Swan* knew that at that moment the poor fellow had begun his vain fight against the inevitable strangulation

The next minute Cameron was calling Long Island again. And in an amazingly short time a reply came back

> "All tubes arrived safely except number 12. The crew is composed of Jackson and Manning, with passengers Phillip Darling and his sister, Mrs. Valery Cameron of New York. Use your own judgment as to next step."

Driscoll slapped Cameron on the back with an assumed cheeriness as the latter looked up from the message the operator held out.

"There's only one procedure, old man," he said. "We must keep on looking for that life tube till kingdom come." Cameron nodded but there was a hopeless look in his eye. He felt only too aware of the slimness of his chances in finding the tube, equipped with only

a short range radio set.

From then on it was a case of blind search.

Two days later the *Swan* was out of range of the Long Island station; and if the missing tube did arrive they had no way of knowing it. But despite Driscoll's continual reassurance it became evident that they were losing hope.

CHAPTER III
The Stranger Again

THE anxiety was telling on Cameron. And to add to his worries the meteoric shower was becoming worse and the *Swan* was in constant danger. The crew of the silver air vessel were striving to find a hole in the storm through which they might pursue their search.

Then it came with a startling abruptness. Driscoll gave a cry and pointed to the screen. There it was—number 12 life tube—lying a thousand miles astern.

In a few minutes the *Swan* had drawn up alongside the tube.

But as the two men from the *Swan* boarded the little craft, their eyes met that same scene of desolation that they had encountered upon her mother ship. A quick test showed she had oxygen—plenty of it. And yet, across the floor of the car were the bodies of Jackson and Manning.

"By God!" flamed Cameron. "These men didn't die of strangulation! Look!"

And as he pointed, Driscoll saw jagged scars across the foreheads of the victims and the dark stains where their life blood had flowed away.

The bodies of the crew of number 12 life tube were also brought aboard the *Swan*.

"And now," said Cameron, "I think there is no time to lose. Some pirate has a hand in this." Cameron and Driscoll exchanged glances. The strange ship.

It had been in their minds all the time. The crew of the life tube had died violent deaths! At whose hands? Why had the stranger run away from them? Who was he? And if he were implicated why should he take Phil Darling and Myrna Cameron?

Cameron gave a sharp order and with a whir of machinery, the *Swan* once more swung away on the high sea of heaven.

Althought Cameron's anxiety had increased he felt as though he were on a definite trail. The strange ship was no doubt mixed up in the mystery. Unregistered ships were so uncommon that they were well the cause of much comment. For the lack of a registration number deprived the ship of registry in the Interstellar Patrol office and therefore it had no radio channel on which it might communicate in case of need. Only those engaged in unlawful expeditions would act as the stranger had. They had now penetrated the worst of the meteoric shower and were running once more in comparatively clear space. Although this relieved the strain somewhat, there was never an instant when one or more pairs of eyes were not anxiously searching the six radio-vision screens before the pilot, showing him the expanse of the heavens in all six directions.

And then very suddenly came Val Cameron's tense voice again.

"Driscoll—what is that to the left?"

Driscoll peered searchingly into the screen mentioned.

"As I live—yes, it is—the stranger again!"

His startling announcement brought Anderson to the doorway of the engine room with a bound.

"What!"

Cameron motioned toward the screen.

"See for yourself, Jeff," he answered. "It might be well for us all to have a look. We don't want to make any mistakes."

But the operator shook his head.

"There's no mistake about that," he said. "It's the bird we want. I'd like to find out how he runs that ship. Not a rocket tube do I see."

It was true, now that they had a good view of the strange ship, that there were no evident means of propulsion.

"Then after him!" was Cameron's next order. "To the guns, Dave. Jeff, give the old tub all she'll take. We must capture this fellow. Careful with the guns, Dave. We don't want to destroy him—just disable him."

Driscoll sprang to the ray gun controls. Anderson turned back into his compartment with a more vigorous than usual, "Aye, aye, sir!"

Swiftly the *Swan* cut the heavens before her. Indeed her name seemed inappropriate now, for more like a hawk she seemed, bearing swiftly upon her prey.

But the elusive stranger was not to be surprised. Away he went, away to the right and then back, plunging blindly into the meteor shower the *Swan* had avoided. Hundreds of thousands of miles from the surface of any planet, each Captain might now give free rein to his modern Pegasus. Not like the wind, but more like the whirling, dashing planets themselves the pursuer and pursued hurled themselves through the interminable space.

And as the *Swan* darted on after the stranger the detectors made its crew aware of an ever increasing presence of meteorites.

"He's leading us back into the shower," was Driscoll's grim observation. "If only we can dodge them." Cameron nodded silent agreement.

About the stranger ahead, there appeared suddenly a strange, pinkish glow. It seemed to envelope the craft in a pink haze.

"Now what do you suppose that is?" mused Dave. This time the pilot of the *Swan* shook his head.

Dr. Sigurd

THEY charged on. And then, without warning, came a sudden strange sound from the detectors and Cameron's warning shout. Frantically he fought with the control. Too late!

A blinding flash—a terrific impact—a deafening report within the car!

The *Swan* was drifting aimlessly. The meteorite had only glanced off the cutter but had delivered a blow of sufficient force to disable the ship. A quick nspection showed that a large section of the nose together with part of the operating equipment had been torn away and the air in that compartment had escaped. The ship was helpless.

But now the men saw with astonishment that the stranger had turned and was approaching them.

"We must get them to pick us up," cried Driscoll. "It's our only chance."

Cameron nodded.

"And a slim one, too."

Swiftly the stranger neared them. And the men in the *Swan* noticed an amazing thing. As if the sky was utterly clear, the ship rode through the stream of meteors. It seemed that the jagged masses of rock suffered some repulsion from the strange craft, for not a single piece penetrated the pinkish haze. The ship had drawn up to the transfer door of the *Swan*. Luckily this had not been damaged by the impact and in a

moment the cutter's crew had thrown it open to the boarding party.

On board came three uniformed armed men, led by a squat, dark-bearded, greenish-skinned man.

"Ah, my friends," he said in sympathetic tones. He spoke English with the atrocious pronunciation of the Venusian. "It is fortunate that I was so near."

"Very," was Val Cameron's earnest agreement.

"But you must come aboard at once. We will tow your ship," insisted the little man. "Allow me to introduce myself. I am Doctor Aaron Sigurd of Barklo, Venus."

"Not the great inventor?" queried Cameron, playing for time as he glanced significantly at the armed men. They too were regarding him.

The doctor bowed ostentatiously.

"A humble inventor," he replied. "Although the planet Venus has always been my home, it is a pleasure to know that my name is familiar to Earth beings."

Cameron introduced himself and his lieutenants.

"I am afraid we cannot thank you enough, Doctor Sigurd," he said as they were conducted on board the strange ship. Cameron was determined to keep up the game of courtesy Sigurd had started.

"Tut, tut, my dear fellow. Tut, tut. We voyagers of space must certainly assist each other. Humanity demands it."

Driscoll and Cameron exchanged puzzled glances. Were they all wrong after all?

The log of the *Swan* Cameron brought away and with Driscoll and Anderson moved to the stranger. Cameron did not mention the disaster to the *Martian* nor the finding of the murdered men.

"Now to get you more comfortable," was the commander's first words as they were all aboard Sigurd's vessel. "If you will come with me I will see that you have proper quarters."

He opened a sliding door that led from the boarding chamber. Stepping through this, the three men found themselves in a long, narrow passage. At one end could be seen a glittering array of machinery. Between them were other compartments; living, sleeping, dining. Forward were other pieces of machinery, tanks for oxygen, water, chemicals, and at the extreme bow was located the pilot house. The walls of this compartment were a maze of wheels, dials, switches, gears, levers and controls.

Just aft of the pilot house there seemed to be a main cabin. And as they entered this following the sturdy commander, they noted a man and girl seated at what appeared to be a reading table. Their features were revealed distinctly in the soft glow from the lamp above their heads.

At the sight of them Val Cameron uttered a cry—a cry of mingled surprise and joy.

"Myrna! Phil!" He sprang forward, arms outstretched

"Val!" In another instant the girl was in the young Captain's arms while Sigurd stared at them in amazement.

"Myrna! Phil!" repeated Cameron. "Is it possible?"

"Val Cameron! In God's name how did you get here?" Darling asked in a strained voice.

"We've been looking for you ever since the *Martian* was reported disabled. We found her, too—and your life tube—but not you."

"Tell me," said the girl. "The steward—"

Val shook his head.

"The oxygen gave out before we reached him."

Prisoners

THE girl bowed her head sadly.

"We all wanted him to leave the ship, but he insisted she was still tight. He refused to leave her."

"But you?" queried Phil. "What brought you here?"

Cameron laughed.

"Our patrol ship shared the fate of the *Martian*. Disabled by a meteorite. Captain Sigurd happened along and was kind enough to come to our aid."

Cameron didn't just exactly mean what he had said by Sigurd just "happening along." But he thought it would save an otherwise embarrassing situation.

"But how good it is to meet you again," said Myrna clinging tightly to her husband. Cameron responded—no less delighted.

"Yes, it is quite a coincidence," smiled the Doctor. But his smile was mirthless and his voice carried no note of warmth. "And now if you will excuse me, I shall see that your staterooms are put in order and a meal prepared for you. I dare say you will need it."

Cameron thanked Sigurd again and the latter bowed himself out.

"And now for a detailed explanation," suggested Phil Darling. "I expect all our friends think that we are lost for good. And how about the other tubes?"

"They all arrived safely," answered Cameron. "All but your number 12."

"I am glad," was Darling's reply.

"Well, we'll soon let them know that you, too, are safe," put in Driscoll cheerily

For a moment Phil hesitated. Myrna's eyes darkened in perplexity. Then her brother turned to Cameron.

"I don't know how to say it," he began. "But we're in a rather peculiar position here. You see, we're practically prisoners."

"Prisoners?" cried Val, while the other men looked at Darling with questioning eyes.

Myrna nodded.

"Yes. Prisoners of a madman. But I'm so glad you are here. Perhaps now we can plan something."

"Is there any danger?" asked Cameron.

Phil pursed his lips before replying.

"Plenty. You see, Doctor Sigurd is testing this ship. It is a craft embodying several new inventions or discoveries of his. And while I don't know the first thing about them, I know that the crew are uneasy every time he puts her through some new stunt."

"The crew?" asked the young Captain. "How many are there?"

"Only six. The *Barta*, he calls it, is the easiest craft to handle for its size that I ever heard of. Of course she will normally carry quite a crew, but Doctor Sigurd seems to think that himself and six men are enough for the tests. You see, it is really a battleship."

"But how does that affect you? You say you are prisoners? How? Why?"

"I mean that this fanatic refuses to set us upon the Earth or any other planet or put us aboard some passing inter-planetary liner. He keeps well out of the paths of travel. It now remains to be seen what he will do about you. If he refuses to set you free, we will then have a definite course to take."

"Hush," was Anderson's warning. "Here he comes."

After an excellent meal, Doctor Sigurd again approached the rescued officers of the *Swan*.

"Would you men like to see something of my craft?" asked the scientist.

"Indeed we would," replied Cameron.

The host led the way forward while Myrna and her brother remained behind. Always thoughtful of Val,

Myrna wanted to be sure her husband's stateroom was in readiness when he wished to retire. As for Phil, he had seen the ship before and did not care to accompany them.

But the three airmen, in spite of what they had passed through, were not too weary to view the wonderful *Barta*.

"In the first place," explained the commander, "I embody the same principle as is generally used in maintaining a gravitational pull toward the floor of the car. This is of course the metal alloy gravity plates.

"But the principle of propulsion as well as my controlling machinery is vastly different from anything in use today.

"If you are interested, I shall be glad to explain."

"Please do," begged Cameron, while Driscoll and Anderson nodded assent.

"In the first place," went on Doctor Sigurd, "your inter-stellar cars are operated on the principle of rocket propulsion. That is crude, crude. I have perfected a machine which draws from space the resolved electric charges which we find there. They were once known as 'cosmic rays'. They are brought together, or reunited and this change is accompanied by a tremendous release of energy. The power is entirely controlled by the machine which generates them. So although at the end the reactive principle of the rocket ultimately furnishes propulsion, it is all an internal process and no fuel need be carried along. The speed of the machine is controlled by the amount of radiation thrown off which is, in turn limited only to the capacity of the attractor. My take-offs and landings are of course assisted by a gravity shielding device."

Cameron whistled. "Gravity shielding?"

The scientist nodded. "That is quite correct."

Cameron stared at him. "You have discovered what men have searched for since the beginning of time."

Sigurd shrugged his shoulders. "It was simple. As that nice, old gentleman of the twentieth century, Albert Einstein showed; gravity is the result of a bend in space caused by the presence of matter. It was at bottom a problem of magnetic forces. I found that if I could eliminate the bend in the locality of my flyer, I could neutralize the pull of gravity. This I have done.

"And that, gentlemen, is the principle of my ship. I have only added inventions which make it possible to use this principle. I am able to accelerate its speed to almost any figure."

"But your electric generators for doing this work—how do you run them?" asked Val, now thoroughly absorbed in the fascinating explanation.

"I was coming to that," smiled the Doctor. "I have on board a device with which I draw my energy for operations from the Sun. It is from this quarter that I get all my electrical power necessary."

CHAPTER IV

Myrna's Story

WITH exclamation of wonder, the crew of the *Swan* continued their tour of the great liner. In the engine room they met the first of Sigurd's crew, a nervous red-haired man named Roberts, bending over a maze of coils and glittering apparatus. In the pilot house they met "Slim" Slater, the chief of the crew, while at their meals they had already met "Handy" Joslin, who had served them. They were all, curiously enough, earthlings and Americans. Joslin seemed to be the cook as well as a machinist and navigator. The other three, who were Venusians, were merely general utility men.

"And now I think you need rest," said the inventor as the tour of the craft was completed. "I shall see you later. And in the meantime I wish you comfort and a refreshing sleep aboard the *Barta*."

"You have a marvelous ship, Dr. Sigurd," said Driscoll sincerely. "I congratulate you."

"Thank you, Lieutenant. I am sorry that your own craft had to meet such an inglorious disaster—but such is to be expected of inter-stellar travel."

Cameron shook his head.

"Well, it couldn't be helped," he replied rather cheerlessly. "After we get it back to Earth it will be made as good as new."

"And now, Myrna, let's have your story," were Val's first words when they had retired to their private stateroom. "What is this all about?"

The girl shook her head gravely.

"It's serious, Val. It amounts to just what we told you. We are prisoners of a madman."

"But—you mean this Doctor Sigurd? Surely he is normal. Why, he is one of the leading scientists of Venus. And he has certainly treated us with courtesy."

"Yes. But wait until you ask him when he intends to return you to the Earth. Then you will see. He flies into a rage. He tells us we shall never see the Earth again. He seems to have some grudge against our planet. He is terrible," and the girl shuddered at the thought of the mad commander.

"And when we left our life tube," she went on, "he took Phil and me off first. I never saw the two men who were operating the tube after that."

"Those two men—" began Val. Then he broke off and shook his head sadly. "I'm afraid you're right, Myrna," he finished. Then he proceeded to tell the girl of the scene they had found aboard life tube number twelve.

"Perhaps," said the girl, "I had better tell you my story from the beginning. You see, our trip from Mars was uneventful until we were only three days from the Earth. Then we ran suddenly into the meteoric shower. The crew assured us there was no danger. But the second hour after we had entered the shower, there was a terrific impact. Some of the passengers were knocked unconscious from the concussion, but Phil and I fortunately were not.

"We were told that a meteorite had just glanced off the car and disabled it. I could hardly believe it when they told us it was no bigger than our heads."

Val laughed.

"It is possible," he said. "At the terrific rate of speed at which they travel, these tiny bodies are extremely hazardous to inter-stellar travel. They become greatly heated by friction when they enter the Earth's atmosphere and burn up or explode before reaching the planet's surface. In rare cases, however, a large one enters and hits the Earth. This gives us our incorrect term of 'shooting star,' which of course was established centuries ago. But out in space there is nothing to stop them.

"But only a very slight glancing blow was all that was necessary to cause quite some damage to the *Martian*. That was our experience in the *Swan*. It was a lucky coincidence that neither of us was hurt."

The Pink Glow

AS Val finished his explanation of the meteorite collisions, Myrna went on with her story.

"After we were disabled we heard that your *Swan* had set out to aid us. But then our emergency radio

set went dead. The passengers became panicky and there was nothing for Captain Billings to do but abandon the ship and take to the life tubes. He had hoped to stay with the ship and save her, for he felt that if the *Swan* reached us in time, they could tow us back to port. If not, he could take to the tubes as a last resort.

"When we took to the tubes, we had been carried out of the worst of the shower. But the steward refused to go with us. He insisted on staying with the *Martian* saying it would be safer than the tubes. So we left him.

"Then, after moving away from the liner, we proceeded toward Earth. But after a few hours' travel, our tube went bad. There was something wrong with the machinery and the crew could not seem to locate the trouble. It was a desperate situation, but at the critical moment, the *Barta* came along. Doctor Sigurd came aboard and our crew began asking questions about him and where his ship came from. Everyone saw that he had no license. I felt that the Doctor didn't like it, but he said nothing. He had Phil and me taken aboard his ship saying our crew would bring our baggage aboard the tube."

"Well, we got our baggage, but never saw Manning or Jackson again. And when we asked about them, we were told that the crew of the *Barta* were taking care of them. But later when we asked to be put aboard an Earth-bound liner, Doctor Sigurd told us that he hated the Earth and we would never see it again.

"Days followed and nothing happened. But in that time we learned that the earthlings of *Barta's* crew had had nothing to do with the disappearance of Manning and Jackson. They had never seen anyone from her except Phil and me. Then came your chase. Although we couldn't see, we knew that something unusual was going on by the way the crew of the *Barta* worked. Then you were picked up and you know what has happened since."

"But, Myrna—that pink glow that hovered about the *Barta* as we chased her? Do you know what that was?"

"Yes," replied the girl. "It is a new discovery of the Doctor's. It enables him to penetrate the meteoric showers in safety. I've heard them talk about repulsion and magnetism, but, of course, I didn't understand it at all. I know, however, that the meteorites are unable to reach the car."

"But why does he keep you prisoners? What is his object? You see, this is not the first time we have seen the *Barta*. We spotted it some time ago and when we tried to find out who it was, he moved away and left the old *Raven* so far in the rear I knew it was a marvelous ship."

"Well, you know all Phil and I do right now," the girl went on. "We have asked several times to be transferred. But he refuses. And he will give no satisfactory reasons."

Val looked thoughtfully at his wife for a moment. Then he turned away.

"There is nothing more to be gained by sitting up worrying," he said. "The best thing we can do is turn in and get what rest we can. For tomorrow we must make a last request to be set off the *Barta*. If Doctor Sigurd refuses, we must then decide upon a course of action."

Myrna nodded. And in spite of their present predicament, the girl's head was soon nestled upon Val's arm as she slept peacefully through the hours. Whatever the future held in store for them, they could now face it together.

The Request Refused

THE officers of the *Swan* and the wife and brother-in-law of her captain breakfasted together. By degrees as Captain Cameron conveyed Myrna's story to his mates their indignation rose. It was agreed that immediately following the meal, the commander of the *Barta* should be requested to put them aboard some Earth-bound liner.

The opportunity came sooner than they had anticipated. Shortly after they had finished eating, Doctor Sigurd made his appearance in the main cabin.

"Dr. Sigurd, may I have a few moments with you?" asked Cameron.

"Well?" the Doctor looked at the young man coldly.

"I only wanted to ask you when it would be convenient to set us aboard some Earth-bound liner. We appreciate your hospitality, but—" the young man got no further.

"And I say you shall not go!" cried the Doctor wrathfully. "I shall not return to your Earth until I can bring a squadron of my super liners to destroy that planet!"

"Doctor!" cried Phil springing to Val's side.

"No!" cried the commander. "You shall not go! I did not ask you to chase me. Yet I could not see you die in your disabled ship. Then stay here. Shall I let you go and tell my secrets to the whole world? No!

"Your Earth is nothing but a great piggish planet. For centuries they fought together with each other. And now that at last all its races are reconciled to each other, they now set out to spread themselves over the entire universe. You Earthmen were the first to perfect the airplane centuries ago. And now you are the first to perfect inter-stellar travel. But you shall not possess everything for your greedy selves. I shall see to that."

"But Doctor Sigurd," interposed Dave Driscoll, "why did you imprison Mrs. Cameron and her brother? They did not know your secrets."

The mad commander turned to the young Lieutenant with burning eyes. "Ah, that is another matter. But I have a reason." And with this he strode from the cabin and slammed the sliding door behind him.

For a moment the captives stood dumbfounded. Then Cameron spoke.

"That settles it," he said quietly. "There remains but one course for us to take."

"And that—?" prompted his Lieutenant.

"Mutiny!"

"Mutiny!" gasped Myrna.

"It is the only course left open," replied her husband. "We must try to influence the crew against their commander. If this fails—well, we must fight it out to a finish. I didn't like his last remark."

The others nodded silent assent.

Not many minutes later, the crazed Captain returned to the salon. His manner had entirely changed as he turned to the group he had so recently defied.

"You will find my tests of interest to you perhaps," he said to the crew of the *Swan*. "As for Mrs. Cameron and Mr. Darling, they have been through them time and again. But for them there is much reading matter in the library. Also radio-vision motion pictures from any planet to which they wish to tune. While it is necessary to conduct my tests, I trust you will be as comfortable as possible. And feel perfectly at liberty to roam about my ship as long as you do not interfere with any of the mechanical devices. You will under-

stand the importance of this, of course and remember you are being watched."

CHAPTER V
To Mercury!

THEY thanked him, whereupon Val and his comrades turned to the motor room. The Doctor went on to the pilot house.

"Well, what do you make of him?" queried Anderson when the Commander was out of earshot.

"He has the manner of a lunatic," replied Driscoll. "One moment a raving maniac—the next as meek as a lamb."

In the engine room of the *Barta*, Slater, Roberts, and Joslin were busily engaged with their equipment. To the three visitors they seemed unusually occupied with their dials, and circuits of the strange craft.

"Howdy," was Slater's greeting to them as they came into the room.

"How are you?" returned Val. "It looks as though you fellows are extra busy."

Slater nodded.

"Yes," he drawled, rather without enthusiasm. "He's going to put her through a test," he indicated the direction of the pilot house with a nod.

"A test?" asked Driscoll quickly. "May I ask what kind?"

"Sure," replied the man. "He's going to try to effect a landing on Mercury!"

"What!" Cameron's words fairly leaped from him.

"Sure," chimed in Roberts.

"How in God's name can he do that?" cried Anderson.

Slater shrugged his shoulders.

"I don't see myself," he replied. "But perhaps the Doctor himself knows how. At least I hope so."

Joslin only grunted.

"Why don't you tell him?" he growled.

"Tell him what?" asked Cameron, sensing that something was on the minds of the *Barta's* crew.

"It amounts to this," replied Slater, suddenly unburdening himself. "We're shipped with a madman."

"A madman?"

Slater nodded.

"Yes. We've put this craft through tests I thought we'd never come out of. But this new one—it's impossible. The Doctor claims that he can nullify the heat rays with his newly-invented rectifying plates. He claims it will break up the heat molecules before they reach the interior of the car. He's crazy. Absolutely crazy."

"Then why don't you quit?" asked Cameron.

"Because he refuses to let us. Oh, of course we could take the ship away from him, but we've been waiting and hoping some more pleasant way would show itself. Besides I think he's got those three Venusians on board to keep watch over us."

"Listen," said Cameron, when Slater had finished. "That is exactly our position. Doctor Sigurd has refused to drop us off at some Earth station or put us aboard some passing Earth-bound liner. He says he hates the Earth, that it is a piggish planet, and that he is going to build a squadron of these liners and return to the Earth and destroy it."

"Oh, he is, is he?" cried Roberts. "Well maybe we won't have something to say about this thing!"

"Exactly," said Driscoll. "When does this test begin?"

"Any time now. We haven't any time to lose. We have been travelling toward Mercury for some time now. We will pass the orbit of Venus soon." Driscoll smiled incredulously. "It's a fact," Roberts nodded, "This craft can make two hundred thousand miles an hour. When we get near Mercury, exposed to the sun, we'll begin to feel the heat. It'll melt us; if we approach it from the dark side, we'll all be frozen to death."

"I'll approach Sigurd once more," replied Val determinedly. "Then if he refuses, we'll put him in irons."

"I'll tell Myrna and Phil of our agreement," Cameron added and turned toward the main cabin. But he got no further.

For as Slater and the young Captain gripped hands, the sliding door of the pilot house opened and Commander Sigurd stepped into the room.

"Well, what does this mean?" he asked tersely.

Mutiny

FOR a moment no man spoke. Then Cameron broke the silence.

"It means, Doctor Sigurd, that your crew and mine have something in common. We all wish to leave the *Barta* before you attempt your next mad test."

"Mad! Mad! You men—" turning to his crew. "You are under my orders. Remember that. Then seize these mutineers and put them in irons. Quick!"

But not a man stirred.

"You'll have to excuse us, Doctor Sigurd," drawled Slater quietly. "But Captain Cameron has stated our views on the matter quite correctly."

"What! You refuse? By God, the lot of you shall die for this!"

His right hand shot to his left arm pit. But it got further.

"Stop him!" cried Slater.

With a single movement, Joslin swept a wrench from a ledge and threw it at the infuriated commander. A grunt escaped the man and his right arm hung limp and useless at his side. But with a frantic effort he endeavored to bring his left into play.

By this time Slater was upon him and in an instant had thrown him to the floor. The others joined in. And though the maniac seemed to have added strength, he was handicapped by his useless arm and was no match for six strong men.

In a few moments he was bound and carried to his room. "Now for the Venusians" Slater said. The men, he explained were off duty now and in the lunch room. It was easy therefore to procure the captain's key and lock them in securely. The surprise of Myrna and Phil when they heard of it knew no bounds. For isolated in the tiny library of the *Barta*, the sounds of the struggle had not reached their ears.

"And to think that I missed getting a crack at him," wailed Phil.

Cameron laughed heartily. It was the first laugh he really had since coming aboard the *Barta*.

"Cheer up," he said, slapping his brother-in-law on the back. "I started to come after you but the old fellow didn't give me a chance."

"Well, anyway, we had better be swinging back."

"We are getting warmer and warmer. And its no fun travelling toward the sun on this ship. Suppose the gravity nullifying equipment fails—whew!"

Joslin was right. The interior of the *Barta* was becoming warmer and the crew of the marvelous ship

sprang to their posts. Shortly afterward the temperature was back to normal. And now, at last, they were homeward bound.

A Reversal

THE mutinous crew were in conference in the main cabin of the *Barta*. The automatic steering apparatus had been set and the ship could run without human aid for a limited length of time.

Joslin was explaining the shuttles or safety cars of the ship.

"There are two of these shuttles," he was telling the men from the *Swan*.

Cameron turned to Joslin.

"Sigurd pointed them out to me," he said, "but did not explain them. He said it was a mere matter of a release circuit very similar to that of the inter-stellar craft."

"Yes. They are operated like that and when free are operated the same as the *Barta* itself. In fact, they are practically identical except for size."

Driscoll leaned back in his easy chair with a sigh of relief.

"I certainly feel better since that maniac has been locked up," he said. "I'm beginning to enjoy myself. If the Earth only knew of our safety, I could enjoy this trip to the fullest extent."

Myrna laughed.

"I think you're getting lazy, Dave," she chided him. But the Lieutenant was not moved.

"Well, when you stop to think of it, haven't we all a right to be lazy after what we've been through?"

"Sure," replied Roberts. "But we're not in yet, so we had better look to the machinery and make sure of our course. And, Slater, did you get that ray gun from Sigurd's pocket after we locked him up?"

"Ray gun?" queried Phil. "You haven't told us of this yet."

"I guess we neglected to do so," replied Slater. "You see, Sigurd has invented a ray pistol using the same general principles with which he protects his car! That's what he reached for when we attacked him. But I guess in his madness he didn't take into consideration that he would have ruined the machinery and possibly cut a hole entirely through the car."

"Ha! No! Well perhaps you will be interested to know that my ship is secretly protected against the ray!"

With a start of terror, the group turned quickly. There, facing them, ray gun in hand, stood the mad commander!

"The next time you tie a man up, get something that will hold him," he laughed mirthlessly. "You forget, too that I am pretty well acquainted with my own locks. Also you overlooked a few ray guns. Taking everything into consideration, I would say it was a very poor job of mutiny."

"And now," he snapped with a brisk jerk of his head. "Get into the library—every one of you."

With the ray gun menacing them, the crestfallen group of mutineers quickly obeyed.

"And now," sneered Doctor Sigurd. "I shall conduct my own experiment. I do not need anyone's help. And when I get to Mercury, you shall all stay behind on the planet."

"Now," he laughed crazily as the lock snapped, making the mutineers prisoners once more, "you shall visit Mercury whether you like it or not!"

Swiftly now, under the direction of her maniacal commander, the *Barta* was wheeled about in the heavens and pointed once more toward Mercury. And as hour after hour passed the prisoners could feel the temperature of the car's interior begin to increase once more.

"God!" cried Val, as he held tightly to his wife. "We must do something. We shall be roasted alive!"

The End of the *Barta*

TOGETHER the six men rushed the door. But it held tightly. They looked helplessly at one another. But only Myrna smiled encouragement.

"We must be brave, boys," she said simply. And they marveled at her coolness; in their hopeless feeling it seemed to bolster them up.

A day passed. The temperature of the room increased. Now the men discarded their uniform coats and cast them away. It sufficed for a while, but before long they were suffering again.

"God—this is terrible! What a distorted brain this scientist must have!"

"He is no scientist," cried Dave. "Only an abnormally devilish maniac!"

Suddenly Phil Darling turned away from the group and made his way to a small writing desk in one corner of the library.

"I have it!" he cried and pulled open a small drawer. His hand fumbled for a moment; then he drew forth an oddly-shaped weapon.

"That is known to an antique dealer as a .45 caliber Colt revolver. Supposed to have been used extensively as a military weapon in the early twentieth century. And I have some of the old ammunition for the thing. It's a chance, but it's worth taking. You see, my dealer on Mars didn't buy this particular model. So I brought it back with me."

With open eyes the group eyed the ancient weapon. Anxiously they awaited the results as Phil stepped to the door.

"Stand back," he cautioned them and placed the muzzle to the lock.

A terrific report resounded back and forth across the small room. Phil threw all his weight against the door. It suddenly gave way and he stumbled out into the main cabin followed by the others.

At that moment the pilot house door burst open.

"For this you all shall die!" yelled the frantic Doctor. A ray gun gleamed in his hand. In back of him stood the three green-faced Venusians.

But at that moment a roar filled the hall, twice, three times, four times. The room was filled with smoke. Sigurd grasped his right wrist with his left hand and the ray gun clattered to the floor. The three Venusians lay on the floor. Sigurd rocked back and forth for a moment. Then he glared at the mutineers with a sneer on his lips. Suddenly he turned and dashed back into the pilot house. The door slammed shut and a mocking laugh floated back to the main cabin.

Then Slater's voice sounded above their exclamations

"Quick! Get that door open before he locks it!"

Cameron dashed to the pilot house door and tried to wrench it open. But it was too late. Sigurd had locked it.

"Your ancient gun, Phil," he cried turning.

Phil Darling shook his head.

"I had only had those five shots," he explained. "It's no good now."

(*Continued on page* 748)

The Flying Legion

by GEORGE ALLAN ENGLAND

(Illustration by Paul)

Not in bursts of flame did they go plunging down the depths, gyrating like mad comets. Quite intact, unharmed but utterly powerless they fell. So all the planes disappeared.

THE FLYING LEGION

What Has Gone Before

The Master, an enigmatic soldier of fortune, becomes tired of life in New York City, after his experiences in the Great War, and decides to embark on an exploration of Arabia. He gathers about him a Flying Legion, a group of other daring ex-soldiers who are likewise tired of their commercial and professional pursuits, and together they steal a great airplane from its stockade on the Palisades.

Among the members of the crew is a Captain Alden, an ex-Army aviator, who had appeared uninvited at the first meeting of The Flying Legion, and who came masked because he declared his face was too horribly mutilated to be seen.

In getting away from the stockade, the defenders had been put to sleep by a lethal gas and they awaken just as the ship is getting under way. A battle takes place, during which a few of the legion are wounded.

One of the wounded is Captain Alden who refuses to allow the Legion's doctor to dress her wounds. She begs for an interview with the Master and reveals herself as a beautiful woman. The Master declares that as soon as they reach land, she will be forced to leave the Legion. On their way across the Atlantic the members of the Legion learn that they have been declared outlaws, and that the international police are watching for them to bring them back dead or alive. As they approach Africa, they perceive in the distance, coming from the east, a great fleet of aircraft of the International Air Police coming to capture them.

CHAPTER XV
Vibrations

TWO, five, a dozen, now a score of tiny specks dotted the mist, some moving right across the broadening face of the sun itself. As Nissr's flight stormed eastward, and these gnats drove to the west, their total rate of approach must have been tremendous; for even as the men watched, they seemed to find the attackers growing in bulk. And now more and ever more appeared, transpiring from the bleeding vapors of dawn.

"Looks like business, sir!" exclaimed the Celt, his jaw hard.

"Business, yes."

"Bad business for us, eh?"

"It might be, if we had only the usual means of defense. Under ordinary circumstances, our only game would be to turn tail and run for it, or cut away far to the south—or else break out a white flag and surrender. But—"

"That must be the Azores air-fleet," judged Bohannan. "The others couldn't have made so much westing, in this time. Faith, what a buzzing swarm of mosquitoes! I had no idea there were that many 'planes on the Azores International Air-board station!"

"There are many things you have no idea of, major," replied the Master, sharply. "That, however, is immaterial. Yes, here come the fringes of attack, all right enough. I estimate forty or fifty in sight, already; and there must be a few hundred back of those between here and land, north and south. Technically we're pirates, you know."

"Pirates!" demanded the major, lowering his glass.

The Master nodded.

"Yes," he answered. "That's what the wireless tells us. We'll get short shrift if—my apparatus fails."

"How do they make us out pirates?" Bohannan ejaculated. It was not fear that looked from his blue eyes, but a vast astonishment. His ruddy face, amazed under the new strengthening light of day, brought a smile to the Master's lips.

"What else are we, my dear fellow?" the Master queried. "To seize a ship—a water-ship or one of the air matters nothing—and to overpower the crew, kill or wound a few, throw them outboard and sail away, comes pretty near to constituting piracy. Of course, the air-rules and laws aren't wholly settled yet; but we're in a fair way of giving the bigwigs a whacking precedent to govern the future. I fancy a good many cases will be judged as per the outcome of this expedition.

"We're pirates all right—if they catch us. And they *will* catch us if they get within gunshot. The next few minutes will settle that question of whether they're going to, or not!"

"Nice, comforting prospect!" muttered the Celt. "What do they do with pirates, anyhow, these days? They can't hang us at the yard-arm, because airships don't have 'em. Of course they might stage a hanging-bee with this Legion dangling from the wings, but that would be pretty hard to manage. It'll be shooting, eh?"

"Probably, if my neutralizer fails."

"You're cheerful about it! The neutralizer may be all right, in its way, but personally I'm rather strong for these!" He laid a hand on the breech of the Lewis machine-gun mounted in the gallery, its grim muzzle pointed out through a slit in the glass screen. "The six guns we've got on board, in strategic positions, look like good medicine to *me!* Wouldn't it be the correct thing to call the gun-crews and limber up a little? Those chaps aren't going to be all day in getting here, and when they do—"

"I admire your spirit, major," interrupted the other, with undertones of mockery, "but it's of the quality that, after all, can't accomplish anything. It's the kind that goes against artillery with rifles. Six guns against perhaps six hundred—and we're not built for rapid maneuvering. That swarm could sting

GEORGE ALLAN ENGLAND

WITH the second installment of this masterpiece of the air, we get into some of its most exciting phases. The Flying Legion, that band of intrepid adventurers, are due for some strange experiences and some revelations—not only at the hands of unknown enemies, but by the Master. The Master proves very eloquently that, in these days of scientific development, even mere bullets have no power against highly-developed scientific instruments. To those who imagine aerial warfare of the future as merely a battle between pilots operating machine guns, this installment will come as a great surprise. You will learn that machine guns will be as ineffective against such scientific instruments as the Master develops, as the French swordsmen and spearmen at the famous battle of Cressy were helpless against the British archers. We are sure you will agree with us, after reading this installment, that The Flying Legion is a story of the air destined to be long remembered.

This story started in our January issue. Back numbers can be had at the rate of 25 cents each.

us a thousand times while we were giving them the first round. No, no, there's nothing for it now, but the neutralizer!"

"My will is made, anyhow," growled Bohannan. "Faith, I'm glad it is!"

The Master gave no reply, but took from the rail the little 'phone that hung there, and pressed a button, four times. He cupped the receiver at his ear.

"You, Enmark?" asked he, of the man at the neutralizer far down in the penetralia of the giant airliner. "Throw in the first control. Half voltage, for three minutes. Then three-quarters, for two; and then full, with all controls. Understand?"

"Yes, sir!" came the crisp voice of Enmark. "Perfectly!"

The Master hung up the receiver, and for a moment stood brooding. An intruding thought had once more forced itself into his brain—a thought of "Captain Alden." In case of capture or destruction, what of the woman? Something very like a pang of human emotion pierced his heart. Impatiently he thrust the thought aside, and turned, with a quiet smile, to Bohannan.

The major, red with excitement and impatience, still had a hand on the machine-gun. He was patting it slightly, his face eloquent of longing and regret.

"Still pinning your faith to steel-jacketed streams of bullets, are you, as against ion-jacketed streams of vibrations?" the Master rallied him. "We shall see, immediately, whether you're right or *I* am! Bullets are all well enough in their place, major, but electrons are sometimes necessary. Vibrations, major—I pin my faith to vibrations."

"Vibrate all you want to!" exclaimed the Celt, irefully, his eyes on the thickening swarm of flyers, some of them now plainly visible in detail against the aching smears of color flung across the eastern reaches of cloudland. "Vibrate away; but give me *this!*" He fondled the gleaming gun as if it had been a pet. "I tell you frankly, if I were in charge here, I'd let the vibrations go to hell and begin pumping lead. I'd have all gun-crews at stations, and the second we got in range I'd open with all six Lewises!"

"Yes, and Nissr would go crumpling down, a minute later, a blazing sieve fore and aft—wings, tanks, fuselage, everything riddled with thousands of bullets. Vibration is the trick, I tell you. It's everything.

"All life is vibration. When it ceases, that is death—and even dead matter vibrates. All our senses depend on vibration. Everything we feel, see, hear, taste comes to our knowledge through vibrations. And the receptive force in us is vibration, too. The brain is just one great, central ganglion for the taking-in of vibrations.

"The secret of life, of the universe itself, is vibration. If we understood all about that, the cosmos would have no secrets from us. So now—ah, see there, will you? See, major, and be convinced!"

A Man

HE pointed eastward, into the blazing sunrise. The outfling of his arm betrayed more human emotion than he had yet shown. Exultation leaped to his usually impassive eyes Surely, had not this expedition—which he had hoped would give surcease from ennui and stir the pulses—had it not already yielded dividends?

"See there, now!" he cried again, and gripped the rail with nervous hands.

"Lord above!" ejaculated the major, squinting through his binoculars.

"Astonished, eh?" demanded the Master, smiling with malice. "Didn't think it would work, did you? Well, which do you choose now, major—bullets or vibrations?"

"This—this is extraordinary!" exclaimed Bohannan. His glasses traveled to and fro, sweeping the fringe-like fan of the attackers, still five or six miles away. "Faith, but this is—!"

The binoculars lowered slowly, as Bohannan watched a falling 'plane. Everywhere ahead there in the brazier of the dawn, as the two men stood watching from the wind-lashed gallery of the on-roaring liner, attackers were dropping. All along the line they had begun to fall, like ripe fruit in a hurricane.

Not in bursts of flame did they go plunging down the depths, gyrating like mad comets with long smoke-trailers and ruddy, licking manes of fire. Not in shattered fragments did they burst and plumb the abyss. No; quite intact, unharmed, but utterly powerless they fell.

Some spiralled down, like dead leaves twirling in autumnal breezes, with drunken yaws and pitches. Others in long slants volplaned toward the hidden sea. miles below the cloud-plain. A few pitched over and over, or slid away in tail-dives. But one and all, as they crossed what seemed an invisible line drawn out there ahead of the on-rushing Eagle of the Sky, bowed to some mysterious force.

It seemed almost as if Nissr were the center of a vast sphere that moved with her—a sphere through which no enemy could pass—a sphere against the intangible surface of which even the most powerful engines of the air dashed themselves in vain.

And still, as others and still others came charging up to the attack like knights in joust, they fell. One by one the white wool cushions of the cloud, gold-broidered by the magic needles of the sun, received them. One by one they faded, vanished, were no more.

So all disappeared. Between a hundred and a hundred and twenty-five planes were silently, swiftly, resistlessly sent down in no more than twenty minutes, while the watchers stood there in the gallery, fascinated by the wondrous precision and power of this new and far-outflung globe of protection.

And again the blood-red morning sky grew clear of attackers. Again, between high heaven's black vault and the fantastic continent of cloud below, nothing remained but free vacancy. The Master smiled.

"Vibrations, my dear major!" said he. "Neutralize the currents delivered by the magnetos of hostile 'planes to their spark-plugs, and you transform the most powerful engines into inert matter. Not all the finely-adjusted mechanism in the world, nor the best of petrol, nor yet the most perfect skill is worth *that,*" with a snap of the strong fingers, "when the spark dies.

"My device is the absolute ruler of whatever spark I direct it against. Our own ignition is screened; but all others within the critical radius become impotent. So you recognize, do you not, the uselessness of machine-guns? The groundlessness of any fears about the Air Patrol's forces?"

"Lord, but this is wonderful!" Bohannan ejaculated. "If we'd only had this in the great war, the Hun would have been wiped out in a month!"

"Yes, but we didn't have it," the Master smiled. "I've just finished perfecting it. Put the last touches on it hardly twenty-four hours ago. If there's ever another war, though—ah, see there, now! Here comes one lone, last attacker!"

He pointed. Far at the edge of empty cloudland, now less blood-stained and becoming a ruddy pink

under the risen sun, a solitary aerial jouster had become visible.

The last attacker seemed a feeble gnat to dance thus alone in the eye of morning. That one 'plane should, unaided, drive on at Nissr's huge, rushing bulk, seemed as preposterous as a mosquito trying to lance a rhinoceros. The major directed a careful lens at this survivor.

"He has his nerve right in his baggage with him," announced the Celt. "Sure, he's 'there.' There can be no doubt he's seen the others fall. Yet—what now? He's turning tail, eh? He's on the run?"

"Not a bit of it! He's driving straight ahead. That was only a dip and turn, for better air. Ah, but he's good, that fellow! There's a man after my own heart, major. Maybe there's more than one, aboard that 'plane. But there's one, anyhow, that's a real man!"

The Master pondered a moment, then again picked up the 'phone.

"Enmark?" he called. "That you?"

"Hello! Yes, sir! What orders, sir?"

"Cut off the ray! Quick, there!"

"Yes, sir!" And through the 'phone the Master heard the *snick* of a switch being hastily thrown.

"What's the idea, now?" demanded the major, astonished. "Going to let that 'plane close in on us, and maybe riddle us?"

The Master smiled, as he made answer:

"I'll chance the bullets, this time. There's a *man* on board that 'plane. A *man!* And we—need men!"

CHAPTER XVI
Leclair, Ace of France

SWOOPING, rising, falling like a falcon in swift search of quarry, the last plane of the Azores squadron swept in toward the on-rushing Eagle of the Sky.

Undismayed by the swift, inexplicable fall of all its companions, it still thrust on for the attack. In a few minutes it had come off the port bows of the giant air-liner, no more than half a mile distant. Now the watchers saw it, slipping through some tenuous higher cloud-banks that had begun to gather, a lean, swift, wasp-like speedster; one of the Air Control Board's—the A. C. B.'s—most rapid aerial police 'planes. The binoculars of the Master and Bohannan drew the machine almost to fingers' touch.

"Only one man aboard her, with a machine gun," commented the Master, eyes at glass, as he watched the flick of sunlight on the attacker's fuselage, the dip and glitter of her varnished wings, the blur of her propellers. Already the roaring of her exhaust gusted down to them.

"Ah, see? She's turning, now. Banking around! We may catch a burst of machine-gun fire, in a minute. Or, no—she's coming up on our tail, major. I think she's going to try and board us!"

"You going to let her?" protestingly demanded Bohannan. His hand twitched against the butt of the Lewis. "In two seconds I could swing this round, sir, and blow that machine hell-for-leather!"

"No, no—let that fellow come aboard, if he wants," the Master commanded. And with eager curiosity in his dark eyes, with vast wonder what manner of human this might be who—all alone after having seen more than a hundred comrades plunge—still ventured closer to grips, the Master watched.

The air-wasp was already swerving, making a spiral glide, coming up astern with obvious intentions. As the two men watched—and as a score of other eyes, from other galleries and ports likewise observed—the lean wasp carried out her driver's plan. With a sudden, plunging swoop, she dived at Nissr for all the world like a hawk stooping at quarry.

A moment she kept pace with the air-liner's whirring rush. She hovered, dropped with a wondrous precision that proved her rider's consummate skill, made a perfect landing on the long take-off that stretched from rudders to wing observation-galleries atop the liner.

Forward on Nissr the wasp ran on her small, cushioned wheels. She stopped, with jammed-on brakes, and came to rest not forty feet abaft the Eagle's beak.

At once, without delay, the little door of the pilot-pit in the wasp's head swung wide, and a heavily-swaddled figure clambered out. This figure stood a moment, peering about through goggles. Then with a free, quick stride, he started forward toward the gallery where he had seen Bohannan and the Master.

The two awaited him. Confidently he came into the wind-shielded gallery on top of Nissr's port plane. He advanced to within about six feet, stopped, gave the military salute—which they both returned—and in a throaty French that marked him as from Paris, demanded:

"Which of you gentlemen is in command here?"

"*Moi, monsieur!*" answered the Master. "And what is your errand?"

"I have come to inform you, in the name of the A. C. B.'s law, recognized as binding by all air-traffic, that you and your entire crew are under arrest."

"Indeed? And then—?"

"I am to take charge of this machine, *monsieur*, and proceed with it as per further instructions from International Aerial headquarters at Washington."

"Very interesting news, monsieur," replied the Master, unmoved. "But I cannot examine your credentials, nor can we negotiate matters of such importance in so off-hand a manner. This gallery will not serve. Pray accompany me to my cabin?"

"*Parfaitement*, monsieur! I await your pleasure!"

The stranger's gesture, his bow, proclaimed the Parisian as well as his speech. The Master nodded. All three proceeded in silence to the hooded companion-way at the forward end of the take-off, that sheltered the ladder. This they descended, to the main corridor.

There they paused, a moment.

"Major," said the Master, "pardon me, but I wish to speak to our—guest, alone. You understand."

The major's glance conveyed a world of indignant protest, but he obeyed in silence. When he had withdrawn into the smoke-room, where a brooding pipe would ill divert his mind from various wild speculations, the Master slid open his own cabin door, and extended a hand of welcome toward it.

"*Après vous, monsieur!*" said he.

The A. C. B. officer entered, his vigorous, compact figure alive with energy, intelligence. The Master followed, slid the door shut and motioned to a chair beside the desk. This chair, of metal, was itself placed upon a metal plate. The plate was new. At our last sight of the cabin, it had not been there.

Taking off goggles and gauntlets, and throwing open his sheepskin-jacket, the Frenchman sat down. The Master also sat down, at the desk. A brief silence, more pregnant than any speech, followed. Each man narrowly appraised the other. Then said the newcomer, still in that admirable French of his:

"You understand, of course, *monsieur*, that it is useless to offer any resistance to the authority of the A. C. B."

"May I take the liberty of inquiring what your credentials are, *monsieur,* and with whom I have the pleasure of speaking?" returned the Master. His eyes, mirroring admiration, peered with some curiosity at the dark, lean face of the Frenchman.

"I," answered the other, "am Lieutenant André Leclair, formerly of the French flying forces, now a commander in the International Air Police."

"Leclair?" demanded the Master quickly, his face lighting with a glad surprise. "Leclair, of the Mesopotamian campaign? Leclair, the world-famous ace?"

"Leclair, *monsieur.* I deprecate the adjectives."

The Master's hand went out. The other took it. For a moment their grip held, there under the bright white illumination of the cabin—for, though daylight had begun fingering round the drawn curtains, the glow-lamps still were burning.

The hand-clasp broke. Leclair began:

"As for you, *monsieur,* I already know you, of of course. You are—"

The Master raised a palm of protest.

"Who I am does not matter," said he. "I am not a man, but an idea. My personality does not count. All that counts is the program, the plan I stand for.

"Many here do not even know my name. No man speaks it. I am quite anonymous, *monsieur.* Therefore I pray you, keep silent on that matter. What, after all, is the significance of a name? You are an ace, an officer. So am I."

"True, *monsieur.* Therefore I more keenly regret the fact that I must place you under arrest, and that charges of piracy in the high air must be lodged against you."

"Thank you for the regret, *monsieur,*" answered the Master dryly. Save for that fact that this strange man never laughed and seldom smiled, one would have thought the odd twinkle in his eye prefaced merriment. "Well, *monsieur,* what now?"

"Will You Sign?"

THE Frenchman produced a silver cigarette-case, opened it and extended it toward the man now technically his prisoner. As yet he had said no word concerning the tremendous execution done the air police forces. His offer of the cigarettes was as calm, as courteous as if they two had met under circumstances of the most casual amity. The Master waved the cigarettes away.

"Thank you, no" said he. "I never smoke. But you will perhaps pardon me if I nibble two or three of these *khat* leaves. You yourself, from your experience in Oriental countries, know the value of *khat.*"

"I do, indeed," said the other, his eyes lighting up.

"And may I offer you a few leaves?"

"No, *monsieur.* I thank you, but tobacco still satisfies." The Frenchman lighted his cigarette, blew thin smoke, and cast intelligent, keen eyes about the cabin. Said he:

"You will not, of course, offer any resistance. I realize that I am here among a large crew of men. I am all alone, it is true. You could easily overpower me, throw me into the sea, and *voilà*—I die. But that would not be of any avail to you.

"Already perhaps a hundred and fifty air police have fallen this morning. It is strange. I do not understand, but such is the fact. Nevertheless, I am here, *monsieur.* I have survived. Survived, to convey organized society's message of arrest. Individuals do not count. They are only representatives of the mass-power of society. *N'est-ce pas?*"

"Quite correct. And then—"

"Sooner or later you must land somewhere for petrol, *monsieur.* For *essence,* eh? Just as sea-pirates were wiped out by the coming of steam-power, which they had to adopt and which forced them to call at ports for coal, so air-pirates will perish because they must have essence. That is entirely obvious. Have I the honor of your signed surrender, *monsieur,* including that of all your men?"

"Just one question, please, *monsieur!*"

"A thousand, if you like," smiled the Parisian, inhaling smoke. His courtesy was perfect, but the glint of his eye made one think of a tiger that purrs, with claws ready to strike.

"What," demanded the Master, "is your opinion of the peculiar and sudden fall of all your companions?"

"I have no opinion as to that. Strange air-currents, failure of ignition due to lack of oxygen—how do I know? A thousand things may happen in the air."

"Not to more than a hundred planes, all in a half-hour."

The Frenchman shrugged indifferent shoulders and smiled.

"It does not signify, *monsieur,*" he murmured. "I am here. That suffices."

"Do you realize that I, perhaps, have forces at my command which may negative ordinary conditions and recognized laws?"

"Nothing can negative the forces of organized society. I repeat my request, *monsieur,* for your unconditional written surrender."

The Master's hand slid over the desk and rested a moment on a button there. A certain slight tremor passed through the Frenchman's body. Into his eyes leaped an expression of wonder, of astonishment. His mouth quivered, as if he would have spoken; but he remained dumb. The hand that held his cigarette, resting on his knee, relaxed; the cigarette fell, smoldering, to the metal plate. And on the instant the fire in it died, extinguished by some invisible force.

"Are you prepared to sign a receipt for this airship, if I deliver her over to you, sir?" demanded the Master, still speaking in French. He smiled oddly.

No answer. A certain swelling of the Frenchman's throat became visible, and his lips twitched slightly, but no sound was audible. A dull flush mounted over his bronzed cheek.

"Ah, you do not answer?" asked the other, with indulgent patronage. "I assume, however, that you have the authority to accept my surrender and that of my crew. I assume, also, that you are willing to sign for the airship." He opened a drawer, took a paper, and on it wrote a few words. These he read over carefully, adding a comma, a period.

Leclair watched him with fixed gaze, struggling against some strange inhibition that bound him with unseen cords of steel. The Frenchman's eye widened, but remained unblinking with a sort of glazed fixity. The Master slid the paper toward him on the desk.

"*Voilà, monsieur!*" said he. "Will you sign this?"

A shivering tremor of the Frenchman's muscles, as the ace sat there so strangely silent and motionless, betrayed the effort he was making to rise, to lift even a hand. Beads of sweat began to ooze on his forehead; veins to knot there. Still he remained seated, without power to speak or move.

"What? You do not accept?" asked the Master, frowning as with puzzlement and displeasure. "But, *monsieur,* this is strange indeed. Almost as strange as the fact that your whole air-squadron, with the sole

exception of your own plane, was dropped through the clouds.

"I have no wish unnecessarily to trouble your mind. Let me state the facts. Not one of those machines was precipitated into the sea. No life was lost. Ah, that astonishes you?"

The expression in the Frenchman's face betrayed intense amazement, through his eyes alone. The rest of his features remained almost immobile. The Master smiled and continued:

"The fleet was dropped to exactly one thousand feet above the sea. There the inhibition on the engines was released and the engines began functioning again. So no harm was done. But not one of those machines can rise higher than one thousand feet until I so choose.

"They are all hopelessly outdistanced, far down there below the cloud-floor. Midges could catch a hawk as readily as *they* could overhaul this eagle of the sky.

"Nowhere within a radius of twenty-five miles can any of those planes rise to our level. This is curious, but true. In the same way, on much the same principle, though through a very different application of it, you cannot speak or move until I so desire. All your voluntary muscles are completely, even though temporarily, paralyzed. The involuntary ones, which carry on your vital processes, are untouched.

"In one way, *monsieur*, you are as much alive as ever. In another you are almost completely dead. Your fleet has enjoyed the distinction of having been the very first to serve as the object of a most important experiment. Likewise, your own person has had the honor of serving as material for another experiment, equally important—an experiment whose effect on your body is similar to that of the first one on the air-fleet.

"You can hear me, *monsieur*. You can see me. I ask you to watch me closely. Then consider, if you please, the matter of placing me under arrest."

His hand touched a small disk near the button he had first pressed; a disk of some strange metal, iridescent, gleaming with a peculiar greenish patina that, even as one watched it, seemed to blend into other shades, as an oil-scum transmutes its hues on water.

Now a faint, almost inaudible hum began to make itself heard. This hum was not localized. One could not have told exactly whence it came. It filled the cabin with a kind of soft murmuring that soothed the senses like the drowsy undertone of bees at swarm.

For a moment nothing happened. Then the pupils of Leclair's eyes began to dilate with astonishment. Immovable though he still remained, the most intense wonder made itself apparent in his look. Even something akin to fear was mirrored in his gaze. Again his lips twitched. Though he could form no word, a dry, choking gasp came from his throat.

And there was cause for astonishment; yes, even for fear. A thing was beginning to take place, there in the bright-lighted cabin of Nissr, such as man's eye had never yet beheld.

The Master was disappearing.

CHAPTER XVII
Miracles, Scourge of Flame

HIS form, sitting there at the desk—his face wearing an odd smile—had already begun to grow less distinct. It seemed as if the light surrounding him had faded, though everywhere else in the cabin it still gleamed with its accustomed brilliance. And as this light around him began to blur into a russet dimness, forming a sort of screen between him and visibility, the definition of his outlines began to melt away.

The Master still remained visible, as a whole; but the details of him were surely vanishing. And as they vanished, faintly a high light, a shadow, a bit of metalwork showed through the space where he sat. He seemed a kind of dissolving cloud, through which now more and more clearly objects beyond him could be distinguished.

As he disappeared, he kept speaking. The effect of that undiminished voice, calm, slow, resonant, issuing from that disintegrating vapor, stirred the hair on the captive Frenchman's neck and scalp.

"Vibration, *mon cher monsieur,*" said he, "is everything. According to the researches of the École Polytechnique, in Paris—no doubt you yourself have studied there, monsieur—vibration of the first octaves from 2 to 8 per second, give us no sense-impression. From the fourth to the fifteenth octave, 16 to 32,768 per second, we get sound. The qualities of the 16th to the 24th are —or have been, until I investigated—quite unknown. The 25th to the 35th, 33,554,432 to 34,359,738,368 vibrations per second, give us electricity. Thence to the 45th, again unknown.

"The 46th to the 48th give us heat. The 49th gives light. The 50th, chemical rays, vibrating 1,125,899,906,842,624 per second. The 51st to the 57th have never been touched by any one save myself. The X-ray group extends from the 58th to the 61st octave. The 62d, with 4,611,686,427,389,904 vibrations per second, is a field where only I have worked. And beyond these, no doubt, other octaves extend with infinite possibilities.

"You will note, monsieur," he continued, while the dun penumbra still more and more withdrew him from Leclair's sight, "that great lacunae exist in the scale of vibratory phenomena. Some of the so-called lower animals take cognizance of vibrations that mean nothing to us. Insects hear notes far above our dull ears. Ants are susceptible to lights and colors unseen to our limited eyes. The universe is full of hues, tones, radiant phenomena that escape us, because our senses are not attuned to them."

Steadily he spoke, and steadily the humming drone that filled the cabin kept its undertones that lulled, that soothed. The Frenchman, staring, hardly breathed. Rigid he sat and pale, with sweat now slowly guttering down his face, his jaws clamped hard and white.

"If the true nature of the universe could be suddenly revealed to our senses," went on the Master, now hardly more than a dull blur, "we could not survive. The crash of cosmic sound, the blaze of strange lights, the hurricane forces of tempestuous energies sweeping space would blind, deafen, shrivel, annihilate us like so many flies swept into a furnace. Nature has been kind; she has surrounded us with natural ray-filters of protection."

His voice now seemed issuing from a kind of vacancy. Save for a slight darkening of the air, nothing was visible of him. He went on:

"With our limited senses we are, in a way, merely peeping out of little slits in an armored conning-tower of life, out at the stupendous vibratory battles of the cosmos. Other creatures, in other planets, no doubt have other sense-organs to absorb other vibratory ranges. Their life-experiences are so different from ours that we could not possibly grasp them, any more than a blind man could understand a painting.

"Nor could those creatures understand human life. We are safe in our own little corner of the universe, comfortably sheltered in our vestments of clay. And

what we cannot understand, we call the supernatural."

From a great vacancy, the Master's words proceeded. Leclair, tugging in vain at the bonds that, invisible yet strong as steel, held him powerless, stared with wild eyes.

"There is no supernatural," said the now disembodied voice. "What we call spirit, psychic force, hypnosis, spiritualism, the fourth dimension is really only life on another scale of vibration. If we could see the whole scale, we would recognize it as a vast, coherent, perfectly natural and rational whole, in which we human beings fill but a very insignificant part. That, monsieur, is absolutely true!

"I have investigated, I have ventured along the coasts of the unknown vibratory sea, and even sailed out a little way on the waters of that unknown, mysterious ocean. Yet even I know nothing. What you are beholding now is simply a slightly new form of vibratory effect. The force that is holding you paralyzed on that chair, is still another. A third, sent down the air squadron. And—there are many more.

"I am not really vanishing. That is but an illusion of your senses, unable to penetrate the screen surrounding me. I am still here, as materially as ever. Illusion, *mon cher monsieur*, yet to you very real!"

The voice seemed moving about. The Frenchman now perceived something like a kind of moving blur in the cabin. It appeared a sort of hole of darkness, in the light; and yet the light has shone through it, too.

Every human eye has a blind spot in the retina. When things pass over this blind spot, they absolutely vanish; the other eye supplies the missing object. To the French ace it seemed that his eyes were all blind spots, so far as the Master was concerned. The effect of this vacancy moving about, shifting a chair, moving a book, speaking to him like a spirit disembodied, its footfalls audible but its own self invisible, chilled the captive's blood. The Master said:

"Now I have totally disappeared from your eye or any other material eye. I cannot even see myself! No doubt dwellers on some other planet would perceive me by some means we cannot imagine. Yet I am materially here. You feel my touch, now, on your shoulder. See, now I put out the lights; now I draw aside this curtain, and admit the golden morning radiance. You see that radiance, but you do not see me.

"A miracle? *Pas du tout!* Nothing but an application of perfectly natural laws. And so—well, now let us come back to the matter under discussion. You have come hither to arrest me, monsieur. What do you think of arresting me, now? I am going to leave that to your own judgment."

A Convert

HIS voice approached the desk. The chair moved slightly, and gave under his weight. Something touched the button on the desk. Something pressed the iridescent metal disk. The humming note sank, faded, died away.

Gradually a faint haze gathered in the chair. Dim, brownish fog congealed there. The chair became clouded with it; and behind that chair objects grew troubled, turbid, dim.

The ace felt inhibitions leaving him. His eyes began to blink; his half-opened mouth closed with a snap; a long, choking groan escaped his lips.

"Nom de Dieu!" he gulped, and fell weakly to rubbing his arms and legs that still prickled with a numb tingling. *"Mais, nom de Dieu!"*

The Master, now swiftly becoming visible, stood up again, smiled, advanced toward his guest—or prisoner, if you prefer.

A moment he stood there, till every detail had grown as clear as before this astounding demonstration of his powers. Then he stretched forth his hand.

"Monsieur," said he, in a voice of deep feeling. "I know and appreciate you for a man of parts, of high courage and devotion to duty in the face of almost certain death. The manner in which you came ahead, even after all your companions had fallen—in which you boarded us, with the strong probability of death confronting you, proves you the kind of man who wins and keeps respect among fighting men.

"If you still desire my arrest and the delivery to you of this air-liner, I am at your complete disposal. You have only to sign the receipt I have already written. If—" and for a moment the Master paused, while his dark eyes sought and held the others, "if, *monsieur*, you desire to become one of the Flying Legion, and to take part in the greatest adventure ever conceived by the mind of man, in the name of all the Legion I welcome you to comradeship!"

"Dieu!" choked the lieutenant, gripping the Master's hand. "You mean that I—*I*—"

"Yes, that you can be one of us."

"Can that be true?"

"It is!"

The Master's right hand closed firmly on Leclair's. The Master's other hand went out and gripped him by the shoulder.

To his feet sprang the Frenchman. Though still shaken and trembling, he drew himself erect. His right hand loosened itself from the Master's; it went to his aviator's helmet in a sharp salute.

"J'y suis! J'y reste!" he cried. *"Mon capitaine!"*

The day passed uneventfully, at high altitudes, steadily rushing into the eye of the East. In the stillness and solitude of the upper air-lines, Nissr roared onward, invincibly, with sun and sky above, with shining clouds piled below in swiftly retreating masses that spun away to westward.

Far below, sea-storm and rain battled over the Atlantic. Upborne on the wings of the eastward-setting wind, Nissr felt nothing of such trivialities. Twice or thrice, gaps in the cloud-veil let dim ocean appear to the watchers in the glass observation-pits; and once they spied a laboring speck on the waters—a great passenger-liner, worrying toward New York in heavy weather. The doings of such, and of the world below, seemed trivial to the legionaries as follies of dazed insects.

No further attack was made on Nissr, nor was anything seen of any other air-squadron of International Police. The wireless picked up, however, a cross-fire of dazed, uncomprehending messages being hurled east and west, north and south—messages of consternation, doubt, anger.

The world, wholly at a loss to understand the thing that had come upon it, was listening to reports from the straggling Azores fleet as it staggered into various ports. Every continent already was buzzing with alarm and rage. In less than eighteen hours the calm and peaceful ways of civilization had received an epoch-making jar. All civilization was by the ears—a hornet's nest prodded by a pole no one could understand or parry.

And the Master, sitting at his desk with reports and messages piling up before him, with all controls at his finger-tips, smiled very grimly to himself.

"If they show such hysteria at just the initial stages of the game," he murmured, "what will they show

when—"

The Legion had already begun to fall into well-disciplined routine, each man at his post, each doing duty to the full, whether that duty lay in pilot-house or cook's galley, in engine-room or pit, in sick-bay or chart-room. The gloom caused by the death and burial at sea of Travers, the New Zealander, soon passed. This was a company of fighting men, inured to death in every form. And death they had reckoned as part of the payment to be made for their adventuring. This, too, helped knit the fine *esprit de corps* already binding them together into a coherent, battling group.

A little after two in the afternoon, Nissr passed within far sight of the Azores, visible in cloud-rifts as little black spots sown on the waters like sparse seed on a burnished plate of metal. This habitation of man soon slipped away to westward, and once more nothing remained but the clear, cold severity of space, with now and then a racing drift of rain below, and tumbling, stormy weather all along the sea horizons.

The Master and Bohannan spent some time together after the Azores had been dropped astern and off the starboard quarter. "Captain Alden" remained in her cabin. She reported by phone, however, that the wound was really only superficial, through the fleshy upper part of the left arm. If this should heal by first intention, as it ought, no complications were to be expected.

Day drew on toward the shank of the afternoon. The sun, rayless, round, blue-white, lagged away toward the west, seeming to sway in high heaven as Nissr took her long dips with the grace and swiftness of a flying falcon. Some time later the cloud-masses thinned and broke away, leaving the world of waters spread below in terrible immensity.

As the African coast drew near, its arid influences banished vapor. Now, clear to the up-curving edge of the world, nothing could be seen below save the steel-gray, shining planes of water. Waves seemed not to exist. All looked smooth and polished as a mirror of bright metal.

At last, something like dim veils of whiteness began to draw and shimmer on the eastern skyline—the vague glare of the sun-crisped Sahara flinging its furnace ardor to the sky. To catch first sight of land, the Master and Bohannan climbed the ladder again, to the take-off, and thence made their way into the starboard observation-gallery. There they brought glasses to bear. Though nothing definite could yet be seen through the shrouding dazzle that swaddled the world's rim, this fore-hint of land confirmed their reckonings of latitude and longitude

"We can't be more than a hundred and fifty miles west of the Canaries," judged the major. "Sure, we can eat supper tonight in an oasis, if we're so minded—with Ouled Nails and houris to hand round the palm-wine and—"

"You forget, my dear fellow," the Master interrupted, "that the first man who goes carousing with wine or women, dies before a firing-squad. That's not the kind of show we're running!"

"Ah, sure, I did forget!" admitted the Celt. "Well, well, a look at a camel and a palm-tree could do no harm. And it won't be long, at this rate, before—"

A sudden, violent concussion, far aft, sent a quivering shudder through the whole fabric of the giant liner. Came a swift burst of flame; black, greasy smoke gushed from the stern, trailing on the high, cold air. Long fire-tongues, banners of incandescence, flailed away, roaring into space.

Shouts burst, muffled, from below. A bell jangled madly. The crackle of pistol-fire punched dully through the rushing swiftness.

With a curse the major whirled. Frowning, the Master turned and peered. Nissr, staggering, tilted her beak sharply, oceanward. At a sick angle, she slid, reeling toward the burnished watery floor that seemed surging up to meet her.

A hoarse shout from the far end of the take-off drew the Master's eyes thither. With strange agility, almost apelike in its prehensile power, a human figure came clambering up over the outer works, clinging, clutching at stays, wires, struts.

Other shouts echoed thinly in the rarefied high air—shouts from unseen men. The climber laughed with savage mockery.

"I've done for *you!*" he howled exultantly. "Fuel-tanks afire—you'll all go to hell blazing when they explode! But first—I'll get the boss pirate of the outfit—"

Swiftly the clutching figure scrambled in over the rail, dropped to the metal plates of the take-off—now slanting steeply down and forward—and broke into a staggering run directly toward the gallery where stood Bohannan and the Master.

At the little ladder-housing sounded a warning shout. The head and shoulders of Captain Alden became visible there. In Alden's right hand glinted a service-revolver.

But already the attacker—the stowaway—had snatched a pistol from his belt. And, as he plunged at full drive down the take-off platform, he thrust the pistol forward.

Almost at point-blank range, howling maledictions, he hurled a murderous fusillade at the Master of the now swiftly falling Eagle of the Sky.

CHAPTER XVIII

"Captain Alden" Makes Good

THE crash of shattered glass mingled with the volley flung by the murderously-spitting automatic of the stowaway. From the forward companion, at the top of the ladder, "Captain Alden" fired—one shot only.

No second shot was needed. For the attacker, grunting, lunged forward, fell prone, sprawled on the down-slanting plates of the take-off platform. His pistol skidded away, clattering, over the buffed metal.

"As neat a shot as the other's was bad," calmly remarked the Master, brushing from his sleeve some glittering splinters of glass. A lurch of Nissr threw him against the rail. He had to steady himself there, a moment. Down his cheek, a trickle of blood serpented. "Yes, rather neat," he approved.

"Hm! A sliver must have cut me," said he, and dismissed it wholly from his mind.

Major Bohannan, with chromatic profanity, ran from the gallery. "Captain Alden" drew herself up the top rounds of the ladder, emerged wholly from the companion and likewise started for the wounded interloper. Both, as they ran toward the fallen man, zigzagged with the pitch and yaw of the stricken airship, slipped on the plates, staggered up the incline.

And others, from the aft companion, now came running with cries, their bodies backgrounded by the leaping flames and smoke that formed a wake behind the wounded Eagle of the Sky.

Before the major and Alden could reach the stowaway, he rallied. Up to hands and knees he struggled. He dragged himself away to starboard. Trailing blood,

he scrambled to the rail.

The major snatched his revolver from its holster. Up came the "captain's" gun once more.

"No, no!" the Master shouted, stung into sudden activity. "Not that! Alive—take him alive!"

The stowaway's answer was a laugh of wild derision; a hideous, shrill, tremulous laugh that rose in a kind of devilish mockery on the air of that high level. For just a second the man hung there, swaying at the rail. Beyond him, up the tilt of the falling Nissr, brighter flames whipped back. Came a burst of smoke, another concussion, a shuddering impact that trembled through the whole vast air-liner. White-hot fire, whirling gusts of incandescence that dissolved in black smoke.

"Take me alive, eh?" the stowaway shouted, madly. "Ha-ha! I see you! You're all dead men, anyhow! I'll go first—show you I'm not afraid!"

With astonishing agility he leaped. Hands on rail, with a last supreme burst of the energy that animated his dying body, he vaulted clear. Out and away he hurled himself. Emptiness of space gathered him to its dizzy, vacant horror.

The Master, quite unmindful of the quickening blood-stream down his face and neck, peered sharply—as if impersonally interested in some problem of ballistics—at the spinning, gyrating figure that with grotesque contortions plummeted the depths.

Over and over, whirling with outflung arms and legs, dropped the stowaway. Down though Nissr herself was plunging, he fell faster. Swiftly his body dwindled, shrinking to a dwarf, an ant-like thing, a black dot. Far below on the steely sea plane, a tiny bubble of white leaped out, then faded. That pinpoint of foam was the stowaway's grave.

"Very good," approved the Master, unmoved. He lurched against the rail, as a sudden manoeuvre of the pilot somewhat flattened out the airliner's fall. The helicopters began to turn, to buzz, to roar into furious activity, seeking to check the plunge. The major came staggering back. But quicker than he, "Captain Alden" was at the Master's side.

"He shot you?" the woman cried, pointing.

"Bah! A splinter of glass!" And the Master shook off the blood with a twitch of his head. "That was a neat bull's-eye you made on him, captain. It saves you from punishment for forgetting you were under arrest; for climbing the ladder and coming above-decks. Yes—I've got to rescind my order. You're at liberty. And—"

"And I stay with the expedition, sir?" demanded Alden, her hand going out in an involuntary gesture of appeal. For the first time, she was showing eagerness of a feminine sort. But she suppressed it, instantly, and stood at attention. "If I have done you a service, sir, reward me by letting me stay!"

"I will see. There may be no expedition to stay with. Now—"

"Life-belts, sir? And take to the small 'planes?" came a voice from the companionway. The face of Manderson—of him who had found the stowaway—appeared there. Manderson looked anxious, a trifle pale. Aft, more figures were appearing. In spite of the iron discipline of the Legion, signs of disorder were becoming evident. "We're hard hit, sir," Manderson reported. "Every man for himself, now? Orders, sir?"

"My orders are, every man back to his post!" cried the Master, his voice a trumpet-call of resolution. "There'll be no *sauve qui peut*, here!" He laid a hand on the butt of his pistol. "Back, every man of you!"

Came another dull, jarring explosion. Nissr reeled to port. The Legionaries trickled down the companion-ladders. From somewhere below a cry arose. "The aft starboard float—it's gone! And the stabilizer—!"

Confused sounds echoed. Nissr sagged drunkenly, lost headway and yawed off her course, turning slowly in the thin, cold air. Her propellers had been shut off; all the power of her remaining engines had now been clutched into the helicopter-drive.

The Master, impersonally smearing off the blood from his neck, made his way toward the forward companion. He had to hold the rail with one hand, for now the metal plates of the observation-gallery were sharply canted. Nissr had got wholly out of hand, so far as steerage-way was concerned; but the rate of her fall seemed to have been a trifle checked.

Alden and the major followed their chief to the companion. All three descended the ladder, which hung inward and away from them at a sharp angle. They reached the strangely inclined floor of the main corridor, and, bracing themselves against the port wall, worked their way aft.

Not all the admirable discipline of the Legion could prevent some confusion. Such of the men as were on duty in pilot-house, pits, wireless or engine-room were all sticking; but a number of off-duty legionaries were crowding into the main corridor. Among them the Master saw Leclair and Rrisa. No one showed fear. The white feather was not visible; but a grim tension had developed. Death, imminent, sobers the boldest.

From the engine-room, shouts, orders, were echoing. The engine-room door flung open. Smoke vomited—thick, choking, gray. Auchincloss reeled out, clutching at his throat.

"What chance?" the Master cried, staggering toward him.

"If—the fire spreads to the forward petrol-tanks, none!" choked the chief engineer. "Aft pit's flooded with blazing oil. Gorlitz—my God!"

"What about Gorlitz?"

"Burned alive—to a crisp! I've got four extinguishers at work. Two engines out of commission. Another only limping! And—"

He crumpled, suddenly dropping to the metals. The Master saw through the clinging smoke, by the dimmed light of the frosted disks, that the skin of the engineer's face and hands was cooked to a char.

"If he's breathed flame—" began the major. Alden knelt beside him, peered closely, made a significant, eloquent gesture.

"Volunteers!" shouted the Master, plunging forward.

Into the fumes and smother, half a dozen men fought their way. From the bulkheads they snatched down the little fire-grenades. The Master went first. Bohannan was second, with Rrisa a close third. Leclair in his forward rush almost stumbled over Alden. The "Captain," masked and still unrecognized as a woman by any save the Master, was thrust back at the door by the Celt, as she too tried to enter.

"No, not you!" he shouted. "You, with only one arm—faith, it's worse than useless. Back, you!" Then he and many plunged into the blazing engine-room.

Thus they closed with the fire-devil now licking ravenous tongues about the vitals of Nissr.

CHAPTER XIX
Hostile Coasts

AN hour from that time, the air-liner was drifting sideways at low altitudes, hardly five hundred feet above the waves. A sad spectacle she made,

her wreckage gilded by the infinite splendors of the sun now lowering toward the sea-horizon. Her helicopters were droning with all the power that could be flung into them from the crippled power-plant. Her propellers—some charred to mere stumps on their shafts—stood starkly motionless.

Oddly awry she hung, driven slowly eastward by the wind. Her rudder was burned clean off; her stern, warped, reeking with white fumes that drifted on the late afternoon air told of the fury that had blazed about her. Flames no longer roared away; but the teeth of their consuming rage had bitten deep. Where the aft observation-pit had been, now only a twisted net of metal-work remained, with all the plate-glass melted and cracked away. The body of Gorlitz, trapped there, had mercifully fallen into the sea. That ghastly thing, at any rate, no longer remained.

Four legionaries were in the pilot-house; the Master, Bohannan, Leclair and "Captain Alden." For the most part, they held silence. There was little for them to say. At length the major spoke.

"Still sagging down, eh?" he commented, his eyes on the needle of the altimeter. "Some situation! Two men dead and others injured. Engines crippled, propellers the same, and two floats so damaged we couldn't float if we came down. Well, by God!"

Leclair looked very grim.

"I regret only," said he in French, "that the stowaway escaped us. Ah, *la belle exécution*, if we had him now!"

The Master, at the starboard window, kept silence. No one sat at the wheel. Of what use could it have been? The Master was peering far to eastward, now with the naked eye, now sweeping the prospect with binoculars. He was studying the African coast, clearly in sight as a long, whitish line of sand with a whiter collar of foamy surf, fifteen miles away.

A few gulls had begun to show—strange, small gulls, yellow-beaked and swift. Off to northward, a native dhow was beating down-wind with full-bellied lateen sail, with matting over its hatches. Heat was beginning to grow intense, for no longer was Nissr making a gale that cooled; no longer was she at high, cold levels. Africa, the tropics, had suddenly become real; and the sudden contrast oppressed them all.

Through the shimmering, quivering air, an arid pallor extended up the eastern sky; a pale, milky illumination, dull-white over the desert, that told of the furnace into which Nissr was drifting—if indeed she could survive till she reached land. The glasses showed tawny reaches of sand, back a little from the coast; and beyond these, low hills, or rather rolling dunes, lay empurpled by vibrant heat-hazes.

"It won't be much like navigating over that hell-spot, three or four miles in the air," muttered Bohannan. He looked infinitely depressed. The way he gnawed at his reddish mustache showed how misadventure raveled his nerve.

No one answered him. Leclair lighted a cigarette, and silently squinted at Africa with eyes long inured to the sun of that land of flame. Alden, at the other window, kept silence, too. That masked face could express no emotion; but something in the sag of the woman's shoulders, the droop of her head, showed how profound was her suffering.

"Faith, are we going to make it, chief?" asked the major, impatiently. Not his the temperament that can wait in silence. He made a singular figure as he lounged there at the pilot-house window, huge elbows on the sill. One hand was wrapped in bandages, well-saturated with carron-oil. Chars and burns on his uniform showed where blazing petrol from the final explosion had spattered him.

His eyes, like the Master's, were blood-shot, inflamed. Part of his red crop of hair had been singed off, and all his eyelashes were gone, as well as half his bushy red brows. But the ugly set of his jaw, the savage gleam of his eyes showed that no physical pain was depressing him. His only trouble was the thought that perhaps the expedition of the Flying Legion had ended before it had really begun.

"What chance, sir?" he insisted. "It's damned bad, according to my way of thinking."

"What you think and what you say won't have any weight with this problem of aerial flotation," the Master curtly retorted. "If we make land, we make it, that's all, sir." He relapsed into silence. Leclair muttered, in Arabic—his words audible only to himself—an ancient Islamic proverb: "Allah knows best, and time will show!" Then, after a moment's pause, the single word: *"Kismet!"*

Silence again, in which the Master's brain reviewed the stirring incidents of the past hour and a half—how the stowaway had evaded Dr. Lombardo's vigilance and, thoroughly familiar with every detail of Nissr, had succeeded in making his way to the after port fuel-tank, from which he had probably drained petrol through a pet-cock and thereafter set it afire; how the miscreant had then scrambled up the aft companion ladder, to shoot down the Master himself; and how only a horrible, nightmare fight against the flames had saved even this shattered wreck of the air-liner.

It had all been Kloof's fault, of course, and Lombardo's. Those two had permitted this disaster to befall, and—yes, they should be punished, later. But how? The Master's mind attacked this problem. Each of the four legionaries in the pilot-house was busy with his own thoughts.

On and on toward the approaching shores of Africa drifted the wounded Eagle of the Sky, making no headway save such as the west wind gave her. Steadily the needle of the altimeter kept falling. The high-pitched drone of the helicopters told that the crippled engines were doing their best; but even that best was not quite enough.

Like a tired creature of the air, she sagged, the liner sank. Before half the distance had been covered to that gleaming beach, hardly six hundred feet lay between the lower gallery of Nissr and the long, white-toothed waves that, slavering, hungered for her body and the despairing crew she bore.

Suddenly the Master spoke into the engine-room telephone.

"Can you do any better?" exclaimed the chief. "That is not enough!"

"We're doing our best, sir," came the voice of Frazier, now in charge.

"If you can possibly strain a point, in some way, and wring a little more power out of the remaining engines—?"

"We're straining them beyond the limit now, sir."

The Master fell silent, pondering. His eyes sought the dropping needle. Then the light of decision filled his eyes. A smile came to his face, where the deep gash made by the splinter of glass had been patched up with collodion and cotton. He plugged in on another line, by the touch of a button.

"Simmonds! Is that you?"

"Yes, sir," answered the quartermaster, in charge of all the stores.

"Have you jettisoned everything?"

"All we can spare, sir. All but the absolute minimum of food and water."

"Overboard with them all!"

"But, sir—"

"And drop the body of Auchincloss, too. This is no time for sentiment!"

"But—"

"My order, sir!"

A Reception Committee

FIVE minutes later, cases, boxes, bales, water-tanks began hurtling from open port and down through the trap-door in the lower gallery. Then followed the seared corpse of Auchincloss, a good man who had died in harness, fighting to the end. Those to whom the duty was assigned of giving his metal-weighted body sea-burial turned away their eyes, so that they might not see that final plunge. But the sound of the body striking the waves rocketed up to them with sickening distinctness.

Lightened a little, Nissr seemed to rally for a few minutes. The altimeter-needle ceased its drop, trembled and even rose .275 degrees.

"God! If we only had an ounce more power!" burst out the major, his mouth mumbling the loose ends of that flamboyant mustache. The Master remained quite impassive, and made no answer. Bohannan reddened, feeling that the chief's silence had been another rebuff. And on, on drifted Nissr, askew, up-canted, with the pitiless-sunlight of approaching evening in every detail revealing—as it slanted in, almost level, over the far-heaving infinitudes of the Atlantic—the ravages wrought by flame.

Bohannan could not long be silent. The exuberance of his nature burst forth with a half-defiant:

"If *I* were in charge, which I'm not, I'd stop these damned helicopters, let her down, turn what power we've got into the remaining propellers, and taxi ashore!"

"And probably break up in the surf, on that beach, there!" curtly rejoined the Master. "Ah! *What?*"

His binoculars checked their sweep along the coast, which in its absolute barrenness looked a place of death for whatever might have life there.

"You see something, *mon capitaine?*" asked Leclair, blowing smoke from his cigarette. "Allow me also to look! Where is it?"

"Just to north of that gash—that wady, or gully, making down to the beach. You see it, eh?"

Slowly the French ace swept the glasses along the surf-foamed fringes of that desolation. Across the lenses no tree flung its green promise of shade. No house, no hut was visible. Not even a patch of grass could be discerned. The African coast lay stretched out in ivory nakedness, clean, bare, swept and garnished by simooms, by cruel heat, by the beatings of surf eternal.

Back of it extended an iron hinterland, savage with desert spaces of sun-baked wrinkled earth and sand here and there leprously mottled with white patches of salt and with what the Arabs call *sabkhah*, or sheets of gypsum. The setting sun painted all this horror of desolation with strange rose and orange hues, with umbers and pale purples that for a moment reminded the Master of the sunset he had witnessed from the windows of Niss'rosh, the night his great plan had come to him. Only eight days ago, that night had been; it seemed eight years!

Carefully Leclair observed this savage landscape, over which a brilliant sky, of luminous indigo and lilac, was bending to the vague edge of the world. Serious though the situation was, the Frenchman could not repress a thought of the untamed beauty of that scene—a land long familiar to him, in the days when he had flown down these coasts on punitive expeditions against the rebellious Beni Harb clans of the Ahl Bayt, or people of the black tents. Africa, once more seen under such unexpected circumstances, roused his blood as he peered at the crude intensity of it, the splendid blaze of its sacred nakedness under the blood-red sun-ball now dropping to rest.

All at once his glass stopped its sweep.

"Smoke, *mon capitaine!*" he exclaimed. "See, it curls aloft like a lady's ringlet. And—beyond the wady—"

"Ah, you see them, too?"

The major's glass, held unsteadily in his unbandaged hand, was now fixed on the indicated spot, as was "Captain Alden's."

"I see them," the Master answered. "And the green flag—the flag of the Prophet—?"

"The flag, *oui, mon capitaine!* There are many men, but—"

"But what, lieutenant?"

"Ah, do you not see? No horses. No camels. That means their oasis is not far. That means they are not traveling. This is no nomadic moving of the Ahl Bayt. No, no, *mon capitaine*. It is—"

"Well, what?"

"A war-party. What you in your language call the—the reception-committee, *n'est-ce pas!* Ah, yes, the reception committee.

"And the guests?" demanded the major.

"The guests are all the members of the Flying Legion!" answered the Frenchman, with another draw at his indispensable cigarette.

CHAPTER XX

The Waiting Menace

"AH, sure now, but that's fine!" exclaimed the major with delight, his eyes beginning to sparkle in anticipation. "The best of news!" A little action, eh? I ask nothing better. All I ask is that we live to reach the committee—live to be properly killed. It's this dying alive that kills *me!* Faith, it tears the nerves clean out of my body!"

"That is a true Arab idea, major," smiled Leclair. "To this extent you are brother to the Bedouin. They call a man *fatis*, as a reproach, who dies any other way than fighting. May you never—may none of us—ever be *fatis!*"

"There's not much danger of that!" put in the Master. "That's a big war-party, and we're drifting ashore almost exactly where they're waiting. From the appearance of the group, they look like Beni Harb people—'Sons of Fighting,' you know—, though I didn't expect we'd sight any of that breed so far to westward."

"Beni Harb, eh?" echoed the Frenchman, his face going grim. "Ah, *mes amis*, it is with pleasure I see that race, again!" He sighted carefully through his glass, as Nissr sagged on and on, ever closer to the waves, ever nearer the hard, sun-roasted shores of Africa. "Yes, those are Beni Harb men. *Dieu!* May it be Sheik Abd el Rahman's tribe! May I have strength to repay the debt I owe them!"

"What debt, lieutenant?" asked the chief.

Leclair shrugged his shoulders.

"A personal matter, *mon capitaine!* A personal debt I owe them—with interest!"

"You will have nearly a score and a half of good fighting men to help you settle your account," smiled the Master. Then, to Bohannan: "It looks now, major, as if you'd have a chance to try your sovereign remedy.

"Faith! Machine-guns, eh?"

"Yes, provided we get near enough to use them."

"No vibrations this time, eh?" demanded the Celt, a bit of good-humored malice in his voice. "Vibrations are all very well in their way, sir, but when it comes to a man-to-man fight—"

"It's not that, major," the chief interrupted. "We haven't the available power, now, for high-tension current. So we must fall back on lesser means.

"You, sir, and Lieutenant Leclair, get the six gun-crews together and at their stations. When we drift in range, give the Beni Harb a few trays of blanks. That may scatter them without any further trouble. We want peace, but if it's got to be war, very well. If they show real fight, rake them hard!"

"They will show fight, surely enough, *mon capitaine,*" put in Leclair, as he and the major made their way to the oddly tip-tilted door leading back into the main corridor. "I know these folk. No blank cartridges will scatter that breed. Even the Turks are afraid of them. They have a proverb: 'Feed the Beni Harb, and they will fire at Allah!' That says it all.

"Mohammed laid a special curse on them. I imagine your orderly, Rrisa, will have something to say when he learns that we have Beni Harb as opponents. Now, sir, we shall make all haste to get the machine-guns into action!"

Major Bohannan laughed with more enjoyment than he had shown since Nissr had left America. They both saluted and withdrew. When the door was closed again, a little silence fell in the pilot-house, the floor of which had now assumed an angle of nearly 30 degrees. The droning of the helicopters, the drift of the sickly white smoke that—rising from Nissr's stern—wafted down-wind with her, the drunken angle of her position all gave evidence of the serious position in which the Flying Legion now found itself. Suddenly the Master spoke. His dismissal of Bohannan and Leclair had given him the opportunity he wanted.

"Captain Alden," said he, bruskly, with the unwillingness of a determined man forced to reverse a fixed decision. "I have reconsidered my dictum regarding you."

"Indeed, sir?" asked the woman, from where she stood leaning against the sill of the slanted window. "You mean, sir, I am to stay with the Legion, till the end?"

"Yes. Your service in having shot down the stowaway renders it imperative that I show you some human recognition. You gained admission to this force by deception, and you broke parole and escaped from the stateroom where I had imprisoned you. But, as you have explained to me, you heard the explosion, you heard the outcry of pursuit, and you acted for my welfare.

A Chance

"I CAN weigh relative values. I grant your request. The score is wiped clean. You shall remain on one condition."

"And what is that, sir?" asked "Captain Alden," with a voice of infinite relief.

"That you still maintain the masculine disguise. The presence of a woman, as such, in this Legion, would be a disturbing factor. You accept my terms?"

"Certainly! May I ask one other favor?"

"What favor?"

"Spare Kloof and Lombardo!"

"Impossible!"

"I know their guilt, sir. Through their carelessness in not having discovered the stowaway and in having let him escape, the Legion came near sudden death. I know Nissr is a wreck, because of it. Still, we need men, and those two are good fighters. Above all, we need Lombardo, the doctor. I ask you to spare them at least their lives!"

"That is the woman's heart in you speaking, now," the chief answered, coldly. His eyes were far ahead, where the war-party was beginning to debouch on the white sands along the shore—full three hundred fighting-men, or more, well armed, as the tiny sparkles of sunlight flicked from weapons proved. As Nissr drew in to land, the Beni Harb grew visible to the naked eye, like a swarm of ants on the desert rim.

"The woman's heart," repeated the Master. "That is your only fault and weakness, that you are a woman and that you forgive."

"You grant my request?"

"No, captain. Nor can I even discuss it. Those two men have cut themselves off from the Legion and signed their own death-warrant. The sentence I have decided on, must stand. Do not speak of this to me again, madam! Now, kindly withdraw."

"Yes, sir!" And Alden, saluting, approached the door.

"One moment! Send Leclair back to me. Inform Ferrara that he is to command the second gun-crew."

"Yes, sir!" And the woman was gone.

Leclair appeared, some moments later. He suspected nothing of the subterfuge whereby the Master had obtained a few minutes' conversation alone with "Captain Alden."

"You sent for me, sir?" asked the Frenchman.

"I did. I have some questions to ask you. Others can handle the guns, but you have special knowledge of great importance to me. And first as an expert ace, what are our chances of making that shore, sir, now probably five miles off? In a crisis, I always want to ask an expert's opinion."

Leclair peered from under knit brows at the altimeter needle and the inclinometer. He leaned from the pilot-house window and looked down at the waves, now hardly a hundred feet below, their foaming hiss quite audible. From those waves, red light reflected from the setting sun illuminated the Frenchman's lean, brown features and flung up wavering patches of illumination against the pilot-house ceiling of burnished metal, through the tilted window that sheerly overhung the water.

"*Eh bien—*" murmured Leclair, non-committally.

"Well, can we make it, sir?"

The ace inspected the vacuum-gauges, the helicopter tachimeters, and shrugged his shoulders.

"*Fais tout, toi-même, et Dieu t'aidera,*" he quoted the cynical old French proverb.* "If nothing gives way, there is a chance."

"If we settle into the sea, do you think that with our damaged floats we can drive ashore without breaking up?"

"I do not, *monsieur.* There is a heavy sea running, and the surf is bad on the beach. This Rio de Oro coast is bad. Have you our exact position?"

"Almost exactly on the Tropic of Cancer, half-way

* "Do everything for thyself, and God will help thee."

between Cape Bojador to north of us, and Cape Blanco, to south."

"Yes, I understand. That brings us to the Tarmanant region of the Sahara. Fate could not have chosen worse for us. But, *c'est la guerre.* All I regret, however, is that in a crippled condition we have to face a war-party of the Beni Harb. Were we intact, and a match for them, how gladly would I welcome battle with that scum of Islam! Ah, the *canaille!*"

CHAPTER XXI
Shipwreck and War

"YOU call them dogs, eh?" asked the chief. "And why?"

"What else are such apostate fanatics? People who live by robbery and plunder—people who, if they find no gold in your money-belt, will rip your stomach open to see if you've swallowed it! People who boast of being *harami*—highwaymen—and who respect the *jallah*, the slave-driver!

"People who practise the barbaric, *thar,* or blood-feud! People who torture their victims by cutting off the ends of their fingers before beheading or crucifying them! People who glory in murdering the 'idolators of Feringhistan,' as they call us white men! Let me advise you, my captain, when dealing with these people or fighting them, never use your last shot on them. Always keep a mercy-bullet in your gun!"

"A mercy-bullet?"

"For yourself!"

The Master pondered a moment or two, as Nissr drifted on toward the now densely-massed Arabs on the beach, then he said:

"You seem to know these folk well."

"Only too well, my captain."

The Master's next words were in the language of the desert:

"*Hádratak tet kal'm Arabic?*" (You speak Arabic?)

"*Na'am et kal'm!*" affirmed the lieutenant, smiling. And in the same tongue he continued, with fluent ease: "Indeed I do, Effendi. Yes, yes, I learned it in Algiers and all the way south as far as the headwaters of the Niger.

"Five years I spent among the Arabs, doing air-work, surveying the Sahara, locating oases, mapping, what until then were absolutely unknown stretches of territory. I did a bit of bombing, too, in the campaign against Sheik Abdul Rahman."

"Yes, so I have heard. You almost lost your life, that time?"

"Only by the thickness of a *semmahseed* did I preserve it," answered the Frenchman. "My mechanician, Lebon, and I—we fell among them on account of engine-trouble, near the oasis of Adrar, not far from here. We had no machine-gun—nothing but revolvers. We stood them off for seven hours, before they rushed us. They captured us only because our last cartridges were gone."

"You did not save the mercy-bullet that time, eh?"

"No, my captain. I did not know them then as I do now. They knocked us both senseless, and then began hacking our machine to pieces with their huge *balas* (yataghans). They thought our 'plane was some gigantic bird

"Superstition festers in their very bones! The giant bird, they believed, would ruin their date-crops; and, besides, they thirsted for the blood of the Franks. As a matter of fact, my captain, these people do sometimes drink a little of the blood of a slaughtered enemy."

"Impossible!"

"True, I tell you! They destroyed our 'plane with fire and sword, reviled us as pigs and brothers of pigs, and named poor Lebon '*Kalb ibn Kalb,*' or 'Dog and son of a dog.' Then they separated into two bands. One band departed toward Wady Tawarik, taking Lebon. They informed me that on the morrow they would crucify him on a cross of palm-wood, head downward."

"And they executed Lebon?"

Leclair shrugged his shoulders.

"I suppose so," he answered with great bitterness. "I have never seen or heard of him since. As for me, they reserved me for some festivities at Makam Jibrail. During the next night, a column of Spanish troops from Rio de Oro rushed their camp, killed sixty or seventy of the brown demons, and rescued me. Since then I have lusted for revenge on the Beni Harb!"

"No wonder," put in the chief, once more looking at the beach, where now the war-party was plainly visible to the naked eye in some detail. The waving of their arms could be distinguished; and plainly glittered the blood-crimson sunset light on rifle-barrels, swords and javelins. The Master loosened his revolver in its holster. "About twenty minutes from now, at this rate," he added, "some of the Beni Harb will have reason to remember you."

"Yes, and may Jehannum take them all!" exclaimed the Frenchman, passionately. His eyes glowered with hate as he peered across the narrowing strip of waves and surf. "Jehannum, where every time their skins are burned off, as the Koran says, new ones will grow to be burned again! Where 'they shall have garments of fire fitted upon them and boiling water poured upon their heads, and they shall be beaten with maces of iron—

"'And their tormentors shall say unto them: Taste ye the pain of burning!'" the Master concluded the familiar quotation with a smile. "Waste no time in wishing the Beni Harb future pain, my dear lieutenant. Jehannum may indeed reserve the fruit of the tree Al Zakkum, for these dogs, but our work is to give them a foretaste of it, to-day. Kismet seems to have willed it that you and the Beni Harb shall meet again. Is it not a fortunate circumstance, for you?"

"Fortunate, yes," the Frenchman answered, his eyes glowing as they estimated the strength of the war-party, now densely massed along the shining sands. "But, thank God, there are no women in this party! That would mean that one of us would have to kill a woman—for God help a woman of Feringhistan caught by these *jinnee,* these devils of the waste!"

They Will Not Stand and Fight

SILENCE again. Both men studied the Beni Harb. The Frenchman judged, reverting to his native tongue: "Certainly more than three hundred of these 'abusers of the salt,' my captain. And we are hardly thirty. Even if we reach land, we must soon sink to earth. Without food, water, anything—*ce n'est pas gai, hein?*"

"No, it is not gay," the chief answered. "But with machine-guns—"

"Machine-guns cannot fight against the African sun, against famine, thirst, delirium, madness. Well—'blessed be certainty,' as the Arabs say."

"You mean death?"

"Yes, my captain. We always have that in our grasp, at any rate—after having taken full toll of these devils. I should not mind, so much, defeat at the hands of the nobler breed of the Arabian peninsula. There, in the

Ruba el Khali itself,* I know a chivalric race dwells that any soldier might be proud to fight or to rule over. But these Shiah heretic swine—ah, see now, they are taking cover already? They will not stand and fight, like men!"

Scornfully he flung a hand at the Beni Harb. The fringes of the tribe were trickling up the sands, backward, away, toward the line of purple-hazed dunes that lined the coast. More and more of the war-party followed. Gradually all passed up the wady, over the dunes and vanished.

"They are going to ambush us, my captain," said Leclair. "'In rice, strength; in the Beni Harb, manhood!'"

Nearer the land, ever sagging down but still afloat—though now at times some of the heavier surges broke in foam over the rail of the lower gallery the Eagle of the Sky drifted on, on. Hardly a half-mile now lay between airliner and shore. Suddenly the Master began to speak:

"Listen, lieutenant! Events are at a crisis, now. I will speak very plainly. You know the Arabs, good and bad. You know Islam, and all that the Mohammedan world is. You know there are more than 230,000,000 people of this faith, scattered from Canton to Sierra Leone, and from Cape Town to Tobolsk all over Turkey, Africa and Arabia—an enormous, fanatic, fighting race! Probably, if trained, the finest fighting-men in the world for they fear neither pain nor death. They welcome both, if their hearts are enlisted!"

"Yes, yes, I know! Their Hell yawns for cowards; their Paradise opens to receive the brave! Death is as a bride, to the Moslem!"

"Fanatics all, lieutenant! Only a few white men have ever reached Mecca and returned. Bartema, Wild and Joseph Pitt succeeded, and so did Hurgronje, Courtelmont, Burton and Burckhardt—though the Arabs admit only the two last.

"But how many hundreds have been beheaded or crucified! No pilgrimage ever takes place without a few such victims. A race of this type is a potential world-power of incalculable magnitude. Men who will die for Islam and for their master without a quiver—"

"Mon capitaine! What do you mean?"

The lieutenant's eyes had begun to fill with flame. His hand tightened to a fist.

"Mon Dieu, what do you mean, my captain? Can it be possible you dream of—?"

Something whined overhead, from the beach now only about a quarter-mile distant. Then a shot from behind the dunes cracked out challengingly across the crumbling, hissing surf.

"Ah," laughed Leclair, "the ball has opened, eh? Well this is now no time for talk, for empty words. I think I understand you, my captain; and to the death I stand at your right hand!"

Their palms met and clasped, a moment, in the firm grip of a compact between two strong men, unafraid. Then each drew his pistol, crouching there at the windows of the pilot-house.

"Hear how that bullet sang?" questioned the Frenchman. "It was notched—a notched slug, my captain. That is a familiar trick with these dog-people of the Beni Harb. Sometimes, if they have poison, they dip the notched slug in that too. And, ah, what a wound one makes! Dum-dums are a joke beside them!"

Another shot sounded. Many ripped out along the dune. All up and down the crest of the tawny sand-hills, red under the sun now close to the horizon, the fusillade ran and rippled. On Nissr metal plates rang with the impact of the slugs, or glass crashed. The gigantic Eagle of the Air, helpless, received this riddling volley as she sagged ashore, now almost in the grip of the famished surf.

"Yes, the ball is opening!" repeated Leclair, with an eager laugh. His finger itched on the trigger of his weapon; but no target was visible. Why waste ammunition on empty sand-dunes?

"Let it open!" returned the chief. "We'll not refuse battle, no, by Allah! Our first encounter with Islam shall not be a surrender! Even if we could survive that, it would be fatal to this vast plan of mine—of ours, lieutenant. No, we will stand and fight—even till 'certainty,' if Allah wills it so!"

A sudden burst of machine-gun fire, from the upper starboard gallery, crashed out into the sultry, quivering air. The kick and recoil of the powerful Lewis sent a fine, swift shudder through the fabric of the wounded Eagle.

"There goes a tray of blanks," said the Master. "Perhaps that will rout them out, eh? Once we can get them on the run—"

Leclair laughed, scornfully.

"Those dog-sons will not run from blanks, no, nor from shotted charges!" he declared. "Pariahs in faith, despoilers of the Haram—the sacred inner temple—still this breed of *Rafas* (heretic) is bold. Ah, 'these dogs bare their teeth to fight more willingly than to eat.' It will come to hot work soon, I think!"

Eagerly he scanned the dunes, eager for sight of a white *tarboosh* or headgear at which to take a pot-shot. Nothing was visible but sand—though here, there, a gleam of steel showed where the Arabs had nested themselves down in the natural rampart with their long-barreled rifles cuddled through carefully-scooped rifts in the sand.

Again the machine-gun chattered. Another joined it, but no dust-spurts leaped from the dune, where now a continual play of fire was leaping out. The Beni Harb, keenly intelligent, sensed either that they were being fired at with blanks, or that the marksmanship aboard the airliner was execrable. A confused chorus of cries and jeers drifted from the sandhills; and all at once a tall, gaunt figure in a brown and white striped burnous, with the hood drawn up over the head, leaped to sight.

This figure brandished a tremendously long rifle in his left hand. His right was thrust up, with four fingers extended—the sign of wishing blindness to enemies. A splendid mark this Arab made. The Master drew a fine bead on him and fired

Both he and Leclair laughed, as the Arab pitched forward in the sand. Unseen hands dragged the warrior back, away, out of sight. A slug crashed through the upper pane of the port window, flattened itself against the main corridor door and dropped to the sofa-locker.

The Master reached for the 'phone and switched in the connection with the upper starboard gallery.

"Major Bohannan!" he ordered. "No more blanks! The real thing, now—but hold your fire till we drift over the dune!"

"Drift over!" echoed Leclair. "But, monsieur, we'll never even make the beach!"

"So?" asked the chief. He switched to the engine-room.

"Frazier! Lift her a little, now! Rack everything

* Ruba el Khali, "The Empty Abode," a name applied by the Arabs to the Peninsula, especially the vast inner region never penetrated by any white man.

—strain everything—break everything, if you must, but lift her!"

"Yes, sir!" came the engineer's voice. "I'll scrap the engines, sir, but I'll do that!"

Almost as if a mocking echo of the command and the promise, a dull concussion shuddered through Nissr. The drone of the helicopters sank to a sullen murmur; and down below, waves began angrily combing over the gallery.

"Ah, *nom de Dieu!*" cried Leclair, in sudden rage at seeing his chance all gone to pot, of coming to grips with the hated Beni Harb. From the penetralia of the airliner, confused shouts burst forth. The upper galleries grew vocal with execrations.

Not one was of fear; all voiced disappointment, the passion of baffled fury. Angrily a boiler-shop clatter of machine-guns vomited useless frenzy.

Wearily, like a stricken bird that has been forced too long to wing its broken way, the Eagle of the Sky—still two hundred yards from shore—lagged down into the high-running surf. Down, in a murderous hail of fire she sank, into the waves that beat on the stark, sun-baked Sahara shore.

And from three hundred barbarous throats arose the killing-cry to Allah—the battle-cry of Beni Harb, the murder-lusting Sons of War.

CHAPTER XXII
Beleaguered

"*La Illaha Illa Alla, M'hamed rasul Allah!*"

Raw, ragged, exultant, a scream of passion, joy and hate, it rose like the voice of the desert itself, vibrant with wild fanaticism, pitiless and wild.

The wolf-like, high-pitched howl of the Arab outcasts—the robber-tribe which all Islam believed guilty of having pillaged the Haram at Mecca and which had for that crime been driven to the farthest westward confines of Mohammedanism—the howl, I say, tore its defiance through the wash and reflux of the surf.

The pattering hail of slugs continued to zoom from the sand-hills, bombarding the vast-spread wings and immense fuselage of Nissr. For the most part, that bombardment was useless to the Beni Harb. A good many holes, opened up in the 'planes, and some broken glass, were about the Arabs' only reward.

None of the bullets could penetrate the metal-work, unless making a direct hit. Many glanced, spun ricochetting into the sea, and with a venomous buzzing like huge, angry hornets, lost themselves in quick, white spurts of foam.

But one shot at least, went home. Sheltered though the Legion was, either inside the fuselage or in vantage-points at the gun-stations, one incautious exposure timed itself to meet a notched slug. And a cry of mortal agony rose for a moment on the heat-shimmering air—a cry echoed with derision by fifteen score barbarians behind their natural rampart.

There was now no more shooting from the liner. What was there to shoot at, but sand? The Arabs, warned by the death of the gaunt fellow in the burnous, had doffed their headgear. Their brown heads, peeping intermittently from the wady and the dunes, were evasive as a mirage.

The Master laughed bitterly.

"A devil of a place!" he exclaimed, his blood up for a fight; but all circumstances baffling him. A very different man, this, from the calm, impersonal victim of ennui at Niss'rosh or even from the unmoved individual when the liner had first swooped away from New York. His eye was sparkling, now, his face was pale and drawn with anger; and the blood-soaked cotton and collodion gave a vivid touch of color to the ensemble. That the Master had emotions, after all, was evident. Obvious, too, was the fact that they were fully aroused. "What a devil of a place! No way to get at those dog-sons, and they can lie there and wait for Nissr to break up!"

"Yes, my captain, or starve us where we lie!" the lieutenant put in. "Or wait for thirst and fever to do the work. Then—rich plunder for the sons of theft!"

"Ah, Leclair, but we're not going to stay here, for any such contingency!" exclaimed the chief, and turned toward the door. "Come, *en avant!* Forward, Leclair!"

"My captain! You cannot charge an entrenched enemy like that, by swimming a heavy surf, with nothing but revolvers in hand!"

"Can't, eh? Why not?"

"The rules of war—"

"To hell with the rules of war!" shouted the Master, for the first times in years breaking into profanity. "Are you with me, or are you—"

"Sir, do not say that word!" cried the Frenchman, reddening ominously. "Not even from you can I accept it!"

The Master laughed again, and strode out into the main corridor, with Leclair close behind him.

"Men!" he called, his voice blaring a trumpet-call to action. "Volunteers for a shore-party to clean out that kennel of dogs!"

None held back. All came crowding into the spacious corridor, its floor now laterally level but sloping downward toward the stern as Nissr's damaged aft-floats had filled and sunk.

"Revolvers and lethal pistols!" he ordered. "And knives in belts! Come on!"

Up the ladder they swarmed to the take-off gallery. Their feet rang and clattered on the metal rounds. Other than that, a strange silence filled the giant airliner. The engines now lay dead. Nissr was motionless, save for the pitch and swing of the surf that tossed her; but forward she could no longer go.

As the men came up to the top gallery, the hands of the setting sun reached out and seized them with red ardor. The radiance was half-blinding, from that sun and from light reflected by the heavily running waves, all white-caps to shore. On both aileron-tips, the machine-guns were spitting intermittently, worked by crews under the major and Ferrara, the Italian ace.

"Cease firing!" ordered the Master. "Simonds, you and Prisrend deal out the lethal guns. Look alive, now!"

Sheltering themselves from the patter of slugs behind stanchions and bulwarks, the legionaries waited. The sea-wind struck them with hot intensity; the sun, now almost down, flung its river of blood from ship to horizon, all dancing in a shimmer of heat.

By the way Nissr was thumping her floats on the bottom, she seemed about to break up. But, undismayed, the legionaries armed themselves, girt on their war-gear and, cool-disciplined under fire, waited the order to leap into the sea. Not even the sight of a still body in the starboard gallery—a body from under which a snaky red line was crawling, zigzagging with each pitch of the liner—gave them any pause. This crew was well-blooded, ready for grim work of give-and-take.

"A task for me, sir!" exclaimed Captain Alden, pointing at the body. The Master refused.

"No time for nursing, now!" he negatived the plea.

"Unless you choose to remain behind?"

"Never, sir!"

"Can you swim with one arm?"

"With both tied!"

"Very well! All ready, men! Overboard, to the beach! There, dig in for further orders. No individual action! No charge, without command! Overboard—come on—who follows me?"

He vaulted the rail, plunged in a white smother, surged up and struck out for shore. Rrisa was not half a second behind him. Then came all the others (save only that still figure on the buffed metals), a deluge of leaping, diving men.

On the Beach

THE surf suddenly became full of heads and shoulders, vigorous arms, fighting beachward. Strong swimmers every one, the Legion battled its way ashore, out from under Nissr's vast-spreading bulk, out from under her forward floats. Not one legionary but thrilled with the killing-lust, the eager spur of vengeance for Kloof, first victim of the Beni Harb's attack.

Along the dune, perhaps five hundred yards back of the beach, very many heads now appeared. The Arabs well knew themselves safe from attack, so long as these hated white swine of *Ajam** were in the breakers. Golden opportunity to pick them off, at ease!

A long, ragged line of desert men appeared, in burnouses and *benishes* or loose floating garments, and all heavily armed. The last bleeding rays of the sunset flickered on the silver-mounted rifles as they spit fire into the heat-quivering air.

All about the swimmers, water-spouts jetted up. Two men grunted, flailed wild arms and sank, with the water about them tinged red as the sunset. Another sank face downward, a moment, then with only one arm, continued to ply for land, leaving a crimson trail behind.

None of the untouched legionaries took any heed of this, or stopped their furious swimming to see what damage had been done or to offer help. Life was at stake. Every second in the breakers was big with death. This was stern work, to be put through with speed. But the faces of the swimming men grew hard to look upon.

The Master and Leclair were first to touch foot to the shelving bottom, all churned up by the long cavalry-charges of the sea-horses, and to drag themselves out of the smother. Rrisa and Bohannan came next, then Enemark, and then the others—all save Beziers and Daimamoto, French ace and Japanese surgeon, whose work was forever at an end. Enemark, engineer and scientist, shot through the left shoulder, was dragged ashore, strangling, by eager hands.

"Down! Down!" shouted the Master. "Dig in!"

Right well he knew the futility, the suicidal folly of trying to charge three hundred entrenched men with a handful of panting, exhausted soldiers armed only with revolvers.

"Take cover!" his cry rang along the beach. They obeyed. Under a galling fire that flung stinging sand into their faces and that took toll of two more legionaries, wounded, the expedition dug for its very life.

The best of strategy! The only strategy, the Master knew, as—panting a little, with thick, black hair glued by sea-water to his head—he flattened himself into a little depression in the sand, where the first ripple of the dunes began.

Hot was the sand, and dry. Withered camel-grass grew in dejected tufts here, there, interspersed with a few straggles of halfa. A jackal's skull, bleached, lay close to the Master's right hand. Its polish attested the care of others of its kind, of hyenas and of vultures. Just so would a human skull appear, in no long time, if left to nature's tender ministrations. Out of an eye-hole of the skull a dusty gray scorpion half crawled, then retreated, tail over back, venomous, deadly.

Death lurked not alone in sea and in the rifles of the inhabitants of this harsh land, but even in the crawling things underfoot.

The Master paid no heed to shriveled grass, to skull or scorpion. All his thoughts were bent on the overcoming of that band of Islamic outcasts now persistently pot-shotting away at the strange flying men from unknown lands "that faced not Mecca nor kept Ramadan"*—men already hidden in swiftly scooped depressions, from which the sand still kept flying up.

"Steady, men!" the Master called. "Get your wind! Ready with the lethal guns! Each gun, one capsule. Then we'll charge them! And—no quarter!"

Again, silence from the Legion. The fire from the dunes slackened. These tactics seemed to have disconcerted the Beni Harb. They had expected a wild, only half-organized rush up the sands, easily to be wiped out by a volley or two from the terribly accurate, long-barreled rifles. But this restraint, this business-like entrenching reminded them only too forcibly of encounters with other men of the Franks—the white-clad Spanish infantry from Rio de Oro, the dreaded *piou-pious*, zouaves, and *Légion Étrangère* of the French.

Firing ceased, from the Beni Harb. Silence settled on both sides. From the sea, the noise of waves breaking along the lower works of Nissr mingled with the hiss and refluent slither of the tumbling surf on the gleaming beach. For a while peace seemed to have descended.

A purple shade settled over the desert. The sun was nearly gone, now, and dusk would not be long in closing its chalice down over the light-wearied world. Leclair, entrenched beside the Master, whispered:

"They do not understand, these dog-brothers—may Allah make their faces cold!" He grinned, frankly, with sparkling eyes and white teeth. "Already we have their beards in our hands!"

The Master's only answer was to draw from his pocket an extra lethal-gun, hand it over and, in a whisper, hastily instruct the Frenchman how to use it. Then he cried, loudly:

"Ready, men!! Fire!"

All along the line, the faint, sighing hiss of the strange weapons sounded. Over the top of the dune little, almost inaudible explosions began taking place as—*plop! plop! plop!*—the capsules burst. Not now could their pale virescence be seen; but the Master smiled again, at realization that already the lethal gas was settling down upon the horde of Shiah outcasts.

To Leclair he whispered in Arabic an ancient saying of the desert folk: "'Allah hath given skill to three things, the hands of the Chinese, the brains of the Franks, the tongues of the Arabs!'" He added: "When the gas strikes them, they would think the Frankish brain more wonderful than ever—if they could think at all!"

He slid his hand into the breast of his jacket, pulled

* Arabs divide the world into two categories; themselves, and *Ajam*, or all non-Arabs.

* The principal Mohammedan fast.

a little cord and drew out a silver whistle, the very same that he had used at Gallipoli. As he slid it to his lips, they tautened. A flood of memories surged over him. His fighting blood was up, like that of all the other legionaries in that hasty trench-line along the white sand-drifts.

A moment's silence followed. Outwardly, all was peace. No sound but the waves broke the African stillness. A little sand-grouse, known as *kata* by the Arabs, came whirring by. Far aloft, a falcon wheeled, keen-eyed for prey. Once more the deadly scorpion peeped from the skull, an ugly, sullen, envenomed thing.

The Master held up the silver whistle, glinting in the last sun-glow. They saw it, and understood. All hearts thrilled, tightening with the familiar sense of discipline. Fists gripped revolver-butts; feet shuffled into the sand, getting a hold for the quick, forward leap.

Keenly trilled the whistle. A shout broke from some twenty-five throats. The men leaped up, forward, slipping, staggering in the fine sand, among the bunches of dried grass. But forward they drove, and broke into a ragged, sliding charge up the breast of the dunes.

"Hold your fire, men! Hold it—then give 'em hell!" the Master shouted. He was in the first wave of the assault. Close by was Rrisa, his brown face contracted with fanatic hate of the Beni Harb, despoilers of the Haram sanctuary.

There, too, was "Captain Alden," grim with masked face. There was Bohannan, Leclair—and pistol-barrels flickered in the evening glow, and half the men gripped knives in their left hands, as well. For this was to be a killing without quarter, to the very end.

CHAPTER XXIII
A Mission of Dread

PANTING, with a slither of dry sand under their laboring feet, the legionaries charged. At any second, a raking volley might burst from the dunes. The lethal pellets—so few in this vast space—might not have taken effect. Not one heart there but was steeling itself against ambush and a shriveling fire.

Up they stormed. The Master's voice cried, once more:

"Give 'em hell!"

He was the first man to top the dune, close to the wady's edge. There he checked himself, revolver in mid-air, eyes wide with astonishment. This way and that he peered, squinting with eyes that did not understand.

"Nom de Dieu!" ejaculated Leclair, at his side.

"Walla!" shouted Rrisa, furiously. "Oh, may Allah smite their faces!"

Each man, as he leaped to the rampart top, stood transfixed with astonishment. Most of them cried out in their native tongues.

Their amazement was well-grounded. Not an Arab was to be seen. Of all those Beni Harb, none remained—not even the one shot by the Master. The sand on the dune was cupped with innumerable prints of feet in rude *babooshes* (native shoes), and empty cartridges lay all about. But not one of the Ahl Bayt, or People of the Black Tents, was visible.

"Sure, now, can you beat that?" shouted Bohannan, exultantly, and waved his service cap. "Licked at the start! They quit cold!"

Sheffield at his side, dropped to the sand, his heart drilled by a jagged slug. The explosion of that shot crackled in from another line of dunes, off to eastward—a brown, burnt ridge, parched by the tropic sun of ages.

Sweating with the heat and the exertion of the charge, amazed at having found—in place of windrows of sleeping men—an enemy still distant and still as formidable as ever, the legionaries for a moment remained without thought or tactics.

Rrisa, livid with fury and baffled hate, flung up wild arms and began screaming the most extravagant insults at the still invisible nomads, whose fire was now beginning again all along their line.

"Oh rejected ones, and sons of the rejected!" the Arab howled. "Oh hogs and brothers of hogs!" He fell to gnawing his own hand as Arabs will in an excess of passion. Once more he screamed: "Oh Allah, deny not their skin and bones to the eternal flame! Oh owls, oxen, beggars, cut-off ones! Oh, give them the burning oil, Allah! The cold faces! Oh, wither their hands! Make them *kusah!* (beardless). Oh these swine with black livers, gray eyes, beards of red. Vilest that ever hammered tent-pegs, goats of El Akhfash! O, Beni Arb!"*

The Master gripped his furious orderly, and pushed him back, down the slope.

"No more of that, Rrisa!" he commanded, fiercely. "These be old woman's ways, these screamings! Silence, *Bismillah!*" (In Allah's name).

He hailed the others.

"They score, the first round! Their game is to retreat, if they're suspicious of any ruse or any attack from us. They're not going to stand and fight. We can't get near enough to them to throw the remaining lethal capsules over. And we can't chase them into the desert. Their plan is to hold us here, and pick us off one by one—wipe us out, without losing a man!

"Dig in again! That's our only game now. We're facing a situation that's going to tax us to the utmost, but there's only one thing to do—dig in!"

Life itself lay in digging, death in exposure to the fire of those maddeningly elusive, unseen Bedouins Like so many dogs the legionaries once more fell to excavating, with their knives and their bare hands, the sun-baked sand that slithered back again into their shallow trench almost as fast as they could throw it out.

A ragged fire from the Beni Harb lent speed to their efforts. Dead men and wounded could now have no attention. Life itself was all at stake.

In their rude trench they lay, at last sweating, panting, covered with sand and dust, with thirst beginning to take hold on them, and increasing swarms of flies—tiny vicious, black things, all sting and poison—beginning to hum about them. On watch they rested there, while dull umbers of nightfall glowered through the framework of Nissr, tossing in the surf. Without much plan, wrecked, confronted by what seemed perils unsurmountable, the Flying Legion waited for the coming of dark to respite them from sniping.

The Master, half-way along the line with Leclair, Rrisa, the major and "Captain Alden," mentally took stock of losses thus far sustained. The wounded were: Alden, Bohannan (burned), Enemark and himself. The dead: Kloof, Sheffield, Beziers, Travers, Gorlitz, Auchincloss, Daimamoto.

Twenty-four living remained, including Leclair. The mortality, in about eighteen hours, had been 20 per cent. At this rate the Master understood, the Flying Legion was slated for very speedy destruction.

"It's touch-and-go now," he pondered. "We've got

* Beni Harb, or Sons of Battle, by a change in the aspiration of the "H," becomes "Sons of Flight, or Cowardice."

to annihilate these infernal Bedouins, repair the liner and get ahead, or—but there's no 'or' in this! None, at all!"

As dark settled down over the Sahara, the leprous patches of white, saline earth took on a ghostly pallor. The light of the southern stars began to glow with soft radiance. A gigantic emptiness, a rolling vacancy of sea and earth—brine-waves to rear of the Legion, sand-waves ahead—shrank the party to seeming insignificance.

A soft, purple tapestry of night unrolled across the desert; the wind died, and the suffocating breath of overheated sands began to emanate from the baked earth. And ever more and more pestiferously the infernal torment of the flies increased.

Inflamed with chagrin, rage and grief for the lost comrades, the legionaries lay in waiting. No conversation ran along the line. Silence held them—and their own thoughts. Wounds had been dressed as well as they might be. Nothing remained but to await the Master's next command.

"Captain Alden's" suggestion that Kloof, still lying aboard in the liner, should be seen to, met a rebuff from the Master. Living or dead, one man could not now endanger the lives of any others. And that danger still lay in any exposure was proved by the intermittent firing from the Arab lines.

The Beni Harb were obviously determined to hold back any possibility of a charge, or any return to the protection of the giant flying-ship. Bullets whimpered overhead, spudded into the sand, or pinged against metal on the liner. Parthian fighters though these Beni Harb were, they surely were well stocked with munitions and they meant stern business.

"And stern business is what they shall have, once the dark is complete," the Master pondered. "It is annihilation for them or for us. There can be no compromise, nor any terms but slaughter!"

One circumstance was favorable—the falling of the wind. Had it risen, kicking up a harsher surf, Nissr must have begun to break. But as the cupped hand of night, closing over the earth, had also shut away the wind, the airliner was now resting more easily. Surf still foamed about her floats and lower gallery—surf all spangled with the phosphorescence that the Arabs call "jewels of the deep"—but unless some sudden squall should fling itself against the coast, every probability favored the liner taking no further damage.

In silence, save for the occasional easing of positions along the trench, the legionaries waited. Strange dim colors appeared along the desert horizons, half-visible in the gloom—funeral palls of dim purpose, with pale, ghostly reflections almost to mid-heaven.

Some of the men had tobacco and matches that had escaped being wet; and cigarettes were rolled, passed along, lighted behind protections that would mask the match-gleam from the enemy. The comforting aroma of smoke drifted out on the desert heat. As for the Master, from time to time he slipped a khat-leaf into his mouth, and remained gravely pondering.

At length his voice sounded along the trench.

"Men of the Flying Legion," said he, "this situation is grave. We can't escape on foot, north or south. We are without provisions or water. The nearest white settlement is Rio de Oro, about a hundred miles to southward; and even if we could reach that, harassed by the Beni Harb, we might all be executed there, as pirates. We must go forward or die right here on this beach.

The Mission of Death

"IN any kind of a straight fight, we are hopelessly outclassed. There are about 300 men against twenty-four of us, some of whom are wounded. Even if we took life for life, the Bedouins would lose less than ten per cent., and we'd be wiped out. And we couldn't expect to take life for life, charging a position like theirs in the night. It can't be a stand-up battle. It's got to be science against savagery, or nothing."

A murmur of approval trickled along the sands. Confidence was returning. The legionaries' hearts tautened again with faith in this strange, this usually silent and emotionless man whose very name was unknown to most of them.

"Just one other word," the Master continued, his voice calm, unshaken, quite impersonal. "If science fails, do not allow yourselves to be captured. The tortures of hell await any white man taken by these fanatics. Remember, always keep one mercy bullet—for yourselves!"

Another little silence. Then the chief said:

"I am going to take two men and undertake what seems a preposterous attack. I need only two. I shall not call for volunteers, because you would all offer yourselves. You must stay here.

"In case my plan succeeds, you are to come at my call—three long hails. If my plan fails, Major Bohannan will command you; and I know you will all fight to the last breath and to the final drop of blood!"

"Don't do this thing, sir!" the major protested. "What chance of success has it? These desert men can see where a white man is blind. They can scent danger as a hunting-dog scents the spoor of game. You're simply throwing your life away and we need that life!"

"I will take Lieutenant Leclair, who knows these people," the Master continued, paying no heed, "and Rrisa, who is of their kin. You others, all sit tight!"

A chuckling laugh, out there on the vague sands, seemed to mock him. It burst into a raw, barking cachinnation, that somehow stirred the blood with shrinking horror.

"One of the Sahara Sanitary Corps," remarked Leclair, dryly. "A hyena. Well may he laugh! Feasting enough for him and his before this dance is over!"

A gleam of fire, off to the left where the further dunes approached the sea, suddenly began to show. All eyes turned toward it. The little fire soon grew into a leaping flame, its base hidden by sand-mounds.

No Arabs were visible there, but they had surely lighted it, using driftwood from the beach. Up into the purple velvet night whirled sparks and fire-tongues; red smoke drifted on the vagrant desert breeze.

"A signal-fire, *m'almé!*" (master) whispered Rrisa. "It will be seen in far oases. If it burn two hours that will mean an enemy, with great plunder. Others of the Beni Harb will come; there will be gathering of the tribes. That fire must not burn, m'almé!"

"Nor must the Beni Harb live!" To the major: "Collect a dozen lethal guns and bring them to me!"

When the guns were at hand, the Master apportioned them between Leclair, Rrisa and himself. With the one apiece they already had, each man carried five of the guns, in pockets and in belt. The small remaining stock of lethal pellets were distributed and the weapons fully loaded.

"In three minutes, major," said the Master. "We leave these lines. Ten minutes after that, open a scattering fire, all along the trench. Shoot high, so as to

be sure we are not hit."

"Ah, a barrage, sir," the major exclaimed.

"Not in the least. My purpose is quite different. Never mind, but listen to my orders. Keep up that fire sparingly, for five minutes. Then cease. And keep silent till we return.

"Remember, I will give three long hails when we start to come back. Those will warn you not to shoot if you see dim figures in the night. Either we shall be back in these lines by nine o'clock, or—"

"Or we will go after you!" came the voice of "Captain Alden," with a little catch of anxiety not at all masculine. Something in the femininity of her promise stirred the Master's heart, a second, but he dismissed it.

"Either we shall return by nine, or never," he said calmly.

"Let me go, then!" whispered Alden. "Go, in place of you! You are more needed than I. Without you all these men are lost. Without me—they would not miss me, sir!"

"I cannot argue that point with you, captain. We start at once." He turned to Rrisa, and in Arabic said:

"The road we are about to take may lead you to Paradise. A sand-adder, a scorpion or a bullet may be the means. Dost thou stand firm with me?"

The Arab stretched out a thin, brown hand to him in the dark.

"Firm as my faith, Master!" he replied. "Both to help you, and to destroy the Beni Harb (dog sons), I would pass through Al Araf, to Eblis! What will be, must be. No man dieth except by permission of Allah, according to what is written on the scrolls of the angel Al Sijil.

"I go with you, Master, where you go, were it to Jehannum! I swear that by the rising of the stars, which is a mighty oath. *Tawakkal al Allah!* (place reliance on Allah)."

"By the rising of the stars!" repeated Leclair, also in Arabic. "I too am with you to the end, *m'alme!*"

The Master assured himself that his night-glasses with the megaphotic reflectors were in their case slung over his shoulder. He looked once more to his weapons, both ordinary and lethal, and likewise murmured:

"By the rising of the stars!"

Then said he crisply, while the fireglow of Leclair's strongly-inhaled cigarette threw a dim light on tense lines of his wounded face:

"Come! Let us go!"

Leclair buried his cigarette in the warm earth.

Rrisa caught up a handful of sand and flung it toward the unseen enemy, in memory of the derisive pebbles thrown by Mohammed at the Battle of Bedr, so great a victory for him.

Then he followed the Master and Leclair, with a whispered:

*"Bismillah wa Allahu akbar!"**

Together, crawling on their bellies like dusty puff-adders of the Sahara itself, the three companions in arms—American, French, Arab—slid out of the shallow trench, and in the gloom were lost to sight of the beleaguered Flying Legion.

Their mission of death, death to the Beni Harb or to themselves, had begun.

And how it would end no one knew. Not even the Master.

* In the name of Allah, and Allah is greatest!

CHAPTER XXIV
Angels of Death

IN utter silence, moving only a foot at a time, the trio of man-hunters advanced. They spaced themselves out, dragged themselves forward one at a time, took advantage of every slightest depression, every wrinkle in the sandy desert-floor, every mummy-like acacia and withered tamarisk bush, some sparse growth of which began to mingle with the halfa-grass as they passed from the coast-dunes to the desert itself.

Breathing only through open mouths, for greater stillness, taking care to crackle no twig nor even slide loose sand, they labored on, under the pale-hazed starlight. Their goal was vague. Just where they should come upon the Beni Harb, in that confused jumble of dunes and *nullahs* (ravines) they could not tell; nor yet did they know the exact distance separating the Legion's trenches from the enemy. All was vague mystery—a mystery ready at any second, at any slightest alarm, to blaze out death upon them.

None the less, stout-hearted and firm of purpose, they serpented their painful way prone on the hot, dusty bosom of the Sahara. Fate for them and for all the Legion, lay on so slight a thing as the stirring of a twig, the *tunk* of a boot against a bleached camel's skull, the possibility of a sneeze or cough.

Even the chance scaring up of a hyena or a vagrant jackal might betray them. Every breath, every heartbeat was pregnant with contingencies of life and death.

Groveling, they slipped forward, dim, moving shadows in a world of brown obscurity. At any moment, one might lay a hand on a sleeping puff-adder or a scorpion. But even that had been fore-reckoned. All three of them had thought of such contingencies and weighed them. Not one but had determined to suppress any possible outcry, if thus stricken, and to die in absolute silence.

What mattered death for one, if two should win to the close range necessary for discharging the lethal capsules? What mattered it even for two, if one should succeed? The survivors, or the sole survivor, would simply take the weapons from the stricken and proceed.

After what seemed more than an hour, though in fact it was but the ten minutes agreed on with Bohannan, off behind them toward the coast a sudden staccato popping of revolvers began to puncture the night. Up and down the legionaries' trench it pattered, desultory, aimless.

The three men engaged in the perilous task of what the Arabs call *asar* or enemy-tracking, lay prone, with bullets keening high overhead. As the Master looked back, he could see the little spurts of fire from that fusillade.

The firing came from more to the left than the Master had reckoned, showing him, that he had got a little off his bearings. But now he took his course again, as he had intended to do from the Legion's fire; and presently rifle work from the Arabs, too, verified his direction.

The Master smiled. Leclair fingered the butt of his revolver. Rrisa whispered curses:

"Ah, dog-sons, may you suffer the extreme cold of El Zamharir! Ah, may *Rih al Asfar,* the yellow wind, (cholera) carry you all away!"

The racket of aimless firing continued a few minutes, underneath the mild effulgence of the stars. It ceased, from the Legion's trenches at the agreed moment; and soon it died down, also from the Arabs'. Quiet rose again from the desert, broken only by the

surf-wash on the sand, the far, tremulous wail of a jackal, the little dry skitter of scorpions.

The three scouts lay quiet for ten minutes after the volleying had ceased. Silence settled over the plain; but, presently, a low moaning sound came indistinctly from the east. It lasted only a moment, then died away; and almost at once, the slight wind that had been blowing from the sea hushed itself to a strange calm.

Rrisa gave anxious ear. His face grew tense, but he held his peace. Neither of the white men paid any heed to the slight phenomenon. To them it meant nothing. For all their experience with the desert, they had never happened to hear just that thing. The Arab, however, felt a stab of profound anxiety. His lips moved in a silent prayer to Allah.

Once more the Master raised his hand in signal of advance. The three man-stalkers wormed forward again. They now had their direction, also their distance, with extreme precision; a simple process of triangulation, in which the glow of the beach-fire had its share, gave them the necessary data.

Undaunted, they approached the camp of the Beni Harb; though every moment they expected to be challenged, to hear the crack of an alarm-rifle or a cry to Allah, followed by a deadly blast of slugs.

But fortune's scale-pan dipped in their direction, and all held still. The sun-baked desert kept their secret. Onward they crawled, now over sand, now over cracked mud-flakes of saline deposit where water had dried at the bottom of a *ghadir*. All was calm as if the spirit of rest were hovering over the hot, fevered earth, still quivering from the kiss of its great enemy, the sun.

"Peace, it is peace until the rising of the morn!" a thought came to the Master's mind, a line from the chapter Al Kadr, in the Koran. He smiled to himself. "False peace," he reflected. "The calm before the storm!" Prophetic thought, though not as he intended it!

On and on the trio labored, soundlessly. At last the chief stopped, held up his hand a second, lay still! The others glimpsed him by the starlight, nested down in a shallow depression of the sand. They crept close to him.

"Lieutenant," he whispered, "you bombard the left-hand sector, toward the fire and the sea. Rrisa, take the right-hand one. The middle is for me. Fire at will!"

Out from belts and pockets came the lethal pistols. With well-estimated elevation, the attackers sighted, each covering his own sector. Hissing with hardly audible sighs, the weapons fired their strange pellets, and once again as over the woods on the Englewood Palisades—really less than twenty-four hours ago, though it seemed a month—the little greenish vapor-wisps floated down, down, sinking gently on the Sahara air.

This attack, they knew, must be decisive or all would be hopeless. The last supply of capsules was now being exhausted. Everything had been staked on one supreme effort. Quickly the attackers discharged their weapons; then, having done all that could be done, lay prone and waited.

Once again that hollow moaning sound drifted in across the baked expanse of the Sahara—a strange, empty sound, unreal and ominous. Then came a stir of sultry breeze, from the east it strengthened; and a fine, crepitant sliding of sand-particles became audible. Rrisa stirred uneasily.

"Master," he whispered, "we should not delay. If the *jinnee* of the waste overtake us, we may be lost."

"The *jinnee* of the waste?" the Master answered, in a low tone. "What nonsense is this?"

"The simoom, Master—the storm of sand. We call it the work of evil spirits!"

The Master made no reply, save to command silence.

For a time nothing happened in the Arabs' camp. Then came a little stir, off there in the gloom. A sound of voices grew audible. The name of Allah drifted out of the all-enveloping night, to them, and that of his Prophet. A cry: *"Ya Abd el Kadir—"* calling on a patron saint, died before the last word, *"Jilani,"* could find utterance. Then silence, complete and leaden, fell with uncanny suddenness.

The master laughed, dryly. He touched Leclair's arm.

"Strong medicine for the Beni Harb, lieutenant," said he. "Their own *imams* (priests) have strong medicine, too, but not so strong as that of the cursed sons of Feringhistan. Sleep already lies heavy on the eyelids of these sons of Allah. And a deeper sleep shall soon overcome them. Tell me, lieutenant, can you kill men wholesale?"

"Yes, my captain."

"Sleeping men, who cannot resist you? Can you kill them scientifically, in masses, without anger?"

"How do you know, my captain, that it will not be in anger?" And the Frenchman half-eased himself up on hands and knees, peering forward into the night. "After what these Beni Harb—or their close kin—have done to me and to poor Lebon—listen! What was that?"

"What do you mean?"

"That far, roaring noise?"

"It is nothing! A little wind, maybe; but it is nothing, nothing! Come, I am ready for the work!"

The Sleeping Camp

THE Master stood up. Rrisa followed suit. No longer crawling, but walking erect, they advanced. They still used caution, careful to make no noise; but confidence had entered into them. Were not the Arabs all asleep?

The white men's faces were pale and drawn, with grim determination for the task that lay ahead—the task of converting the Beni Harb's camp into a shambles. The Arab's face, with white-rimmed eyes and with lips drawn back from teeth, had become that of a wild animal. Rrisa's nostrils were dilated, to scent out the enemy. He was breathing hard, as if he had run a mile.

"They are near, now, oh Master!" said he. "They are close at hand, these *Nakhawilah!* (pariahs). Allah, the high, the great, hath delivered them into our hands. Verily there is no power or might but Allah. Shall I scout ahead, Master, and spy out the camp?"

"No, Rrisa. I send no man where I will not gladly go myself. All three of us, forward!"

Again they advanced, watchful, revolvers in hands, ready for any sudden ambush. All at once, as they came up over a breastwork of hard clay and gravel that heaved itself into rolling sands, the camp of the Beni Harb became visible. Dim, brown and white figures were lying all about, distorted in strange attitudes, on the sand beyond the ridge. There lay the despoilers of the Haram, the robber-tribe of the Sheik Abd el Rahman, helpless in blank unconsciousness.

The Master laughed bitterly, as he strode forward into the camp, the long lines of which stretched vaguely away toward the coast where the fire was still leaping up against the stars, now paled with a strange haze.

Starlight showed weapons lying all about—long rifles

and primitive flint-locks; *kanat* spears of Indian male-bamboo tipped with steel and decorated with tufts of black ostrich-feathers; and *jambiyahs*, or crooked daggers with wicked points and edges.

"Save your fire, men," said the Master picking up a spear. "There are plenty of means, here, to give these dogs the last sleep, without wasting good ammunition. Choose the weapon you can handle best, and fall to work!"

With a curse on the heretic Beni Harb, and a murmur of thanks to Allah for this wondrous hour, Rrisa caught up a short javelin, of the kind called *mirsak*. The lieutenant chose a wide-bladed sword.

"Remember only one thing, my brothers in arms!" exclaimed the Master. "But that is most vital!" He spoke in Arabic.

"And what may it be?" asked the Frenchman, in the same tongue.

"I do not know whether old Sheik Abd el Rahman is with this party or not, but if either of you find him, kill him not! Deliver him to me!"

"Listen, Master!" exclaimed Rrisa, and thrust the point of his javelin deep into the sand.

"Well, what now, Rrisa?"

"Shall we, after all, kill these sleeping swine-brothers?"

"Eh, what? Thy heart then, has turned to water? Thou canst not kill. They attacked us—this is justice!"

"And if they live, they will surely wipe us out!" put in the Frenchman, staring in the gloom. "What means this old woman's babble, oh son of the Prophet?"

"It is not that my heart has turned to water, nor have the fountains of my eyes been opened to pity," answered Rrisa. "But some things are worse than death, to all of Arab blood. To be despoiled of arms or of horses, without a fight, makes an Arab as the worms of the earth. Then he becomes an outcast, indeed! 'If you would rule, disarm'," he quoted the old proverb, and added another: "'Man unarmed in the desert is like a bird shorn of wings'."

"What is thy plain meaning in all this?" demanded the chief.

"Listen, Master. If you would be the Sheik of Sheiks, carry away all these weapons, and let these swine awaken without them. They would drag their way back to the oases and the black tents, with a story the like of which has never been told in the Empty Abodes. The Sahara would do homage, Master, even as if the Prophet had returned!"

"*Lah!* (no). I am not thinking of the Sahara. The goal lies far beyond—far to eastward."

"Still, the folk are Arabs there, too. They would hear of this, and bow to you, my Master!"

"Perhaps. Perhaps not. I can take no chances, Rrisa. The land, here and to the eastward, might all arise against us. The tribes might come down on us like the *rakham*, the carrion-vultures. No, we must kill and kill, so that no man remains here—none save old Abd el Rahman, if Allah deliver him into our hands!"

"That is your firm command, Master?"

"My firm command!"

"To hear the Master is to obey. But first, grant me time for my *isha*, my evening prayer!"

"It is granted. And, Rrisa, *there* is the kiblah, the direction of Mecca!"

The Master pointed exactly east. Rrisa faced that way, knelt, prostrated himself. He made ablution with sand, as Mohammed allows when water cannot be found. Even as he poured it down his face, the strangely-gusting wind flicked it away in little whirls.

CHAPTER XXV
The Sand Storm

THE Master began to feel a peculiar anxiety. Into the east he peered, where now indeed a low, steady hum was growing audible, as of a million angry spirits growing nearer. The stars along that horizon had been blotted out, and something like a dark blanket seemed to be drawing itself across the sky.

"My captain," said the lieutenant, "there may be trouble brewing, close at hand. A sand-storm, unprotected as we are—"

"Men with stern work to do cannot have time to fear the future!"

Leclair grew silent. Rrisa alone was speaking, now. With a call of *"Ya Latif!"* (Oh Merciful One!) he had begun the performance of his ceremony with rigid exactness. He ended with another prostration and the usual drawing-down of the hands over the face. Then he arose, took up his javelin again, and with a clear conscience cried:

"Now, Master, I am ready for the work of helping Azraël, the death-angel, separate the souls and bodies of these Shiah heretics!"

A sudden howling of a jackal startled Rrisa. He quivered and stood peering into the night, where now the unmistakable hum of an approaching sand-storm was drawing near. His superstitious soul trembled with the old belief of his people that creatures of the dog breed can see Azraël, invisible to human eyes. At thought of the death-angel standing nigh, his heart quaked; but rage and hate inspired him, and he muttered:

"Fire to your bellies, broiling in white flame! Fuel of Jehannum, may Eblis be your bed, and unhappy couch! Spawn of Shaytan (Satan), boiling water to cool your throats! At Al Hakkat (judgment-day) may the jinnee fly away with you!"

"To work, men!" cried the Master. "There is great work to do!"

As if in answer to his command, a blustering, hot buffet of wind roared down with amazing suddenness, filling the dark air with a stinging drive of sand. The fire by the beach flailed into long tongues of flame, throwing back shadows along the side of the wady. No stars were now visible. From empty spaces, a coughing tumult leaped forth; and on the instant a furious gust of fine, cutting particles whirled all about, thicker than driven snow in a northern blizzard.

"Iron, oh thou-ill-omened one!" cried Rrisa, with the ancient invocation against the sand-storm. He stretched out his forefinger, making the sign of protection. Neither the meaning of his cry nor of the gesture could he have explained; but both came to him voluntarily, from the remote lore of his people.

He turned from the oncoming storm, leaning against the wind, clutching for his cap that the wind-devil had just whirled away. After it he stumbled; and, falling to his knees, groped for it in the gloom.

"Thousand devils!" ejaculated the Frenchman. "No time, now, for killing! Lucky if we get back ourselves, alive, to the beach! My captain!"

"What now?" the Master flung at him, shielding mouth and eyes with cupped hands.

"To the wady, all of us! That may give protection till this blast of hell passes!"

A startled cry from Rrisa forestalled any answer. The Arab's voice rose in a wild hail from the sand-

filled dark:

"Oh, Master, Master!"

"What, Rrisa?"

"Behold! I—*I have found him!*"

"Found—?" shouted the Master, plunging forward. Leclair followed close, staggering in the sudden gale. "*Abd el Rahman?*"

"The old hyena, surely! Master, Master! *See!*"

The white men stumbled with broken ejaculations to where Rrisa was crouched over a gaunt figure in the drifting sand.

"Is that he, Rrisa?" cried the Master. "Sure? Art thou sure?"

"As that my mother bore me! See the old jackal, the son of Hareth! (the devil). Ah, see, see!"

"*Dieu!*" exclaimed the Frenchman, in his own tongue. "It is none other!" With a hand of great rejoicing, he stirred the unconscious sheik—over whom the sand was already sifting as the now ravening simoom lashed it along.

Forgotten now were all his fears of death in the sand-storm. This delivery of the hated one into his hands had filled him with a savage joy, as it had the two others. "Ah, *mon vieux!* It is only the mountains that never meet, in time!"

The Master laughed, one of those rare flashes of merriment that at infrequent intervals pierced his austerity. Away on the growing sand-storm the wind whipped that laugh. Simoom and sand now appeared forgotten by the trio. Keen excitement had gripped them; it held them as they crouched above the sheik.

"Allah is being good to us!" exulted the Master, peering by the gale-driven fire-glare. "This capture is worth more to the Legion than a hundred machine-guns. What will not the orthodox tribes give for this arch-Shiah, this despoiler of the sacred Haram at Mecca?"

He began feeling in the bosom of the old man, opening the cloak-like burnous and exploring the neck and chest with eager fingers.

"If we could only lay hands on the fabled loot of the Haram!" he whispered, his voice tense with excitement.

Rrisa, wide-eyed, with curling lips of scorn peered down at the sheik. The orderly, bare-headed, was shielding eyes and face from the sand-blast, with hands that trembled. His lips curled in scorn and hate as he peered at the prostrate heretic.

A tall, powerful figure of a man the sheik was, lying there on his right side with his robe crumpled under him—the robe now flapping, whipping its loose ends in the high and rising wind. His tarboosh had been blown away, disclosing white hair.

That hair, too, writhed and flailed in the gusts that drove it full of sand, that drifted his whole body with the fine and stinging particles. His beard, full and white, did not entirely conceal the three parallel scars on each cheek, the *mashali*, which marked him as originally a dweller at Mecca.

One sinewy brown arm was outflung, now almost buried in the growing sand-drift. The hand still gripped a long, gleaming rifle, its stock and barrel elaborately arabesqued in silver picked out with gold.

"Ah!" exclaimed the Master again, pulling at a thin crimson cord his questing fingers had discovered about the old man's neck. With hands that trembled a little, he drew out this cord. Then he uttered an exclamation of intense disappointment.

"There is nothing here!" he exclaimed. The Master pursed his lips.

Lebon Again

THERE was nothing at the end of the crimson loop, save a *lamail* or pocket Koran. Leclair muttered a curse, and moved away, peering toward the fire, spying out the wady through the now almost choking sand-drive—the wady where they certainly must soon take refuge or be overwhelmed by the buffeting lash of sand whirled on the breath of the shouting tempest.

Even in the Master's anger, he did not throw the Koran away. Too astute, he, for any such act in presence of Rrisa! Instead, he bound the Arab to fresh devotion by touching lips and forehead, and by handing him the little volume. The Master's arm had to push its way against the wind as against a solid thing; and the billion rushing spicules of sand that swooped in upon him from the desert emptiness, stung his flesh like tiny scourges.

"The Koran, Rrisa, is now thine!" he cried in a loud voice, to make the Arab hear him. "And a great gift to thee, a Sunnite, is the Koran of this desecrating son of the rejected!"

Bowed before the flail of the sand—while Rrisa uttered broken words of thanks—the Master called to Leclair:

"By *Corsi* (Allah's throne), now things assume a different aspect! This old dog of dogs is a prize, indeed! And—what now—?"

Leclair did not answer. The Frenchman was not even near him. The Master saw him in the wady, dimly-visible through the ghostly white sand-shrouds spinning in the blue-whipped fire glare. There on hands and knees the lieutenant huddled. With eager hands he was tearing the hood of a *sa'abut*—a rough, woolen slave-cloak, patched and ragged—from the face of a prostrate figure more than half snowed under a sand-drift.

"*Nom de Dieu!*" the Master heard him cry. "*Mais, nom de—*"

"What have you found, lieutenant?" shouted the Master, letting the simoom drive him toward the wady. In their excitement none of the men would yet take cover, lie down and hide their faces under their coats as every dictate of prudence would have bidden. "Who it is, now? What—?"

"Ah, my captain! Ah! the pity of it! Behold!"

The Frenchman's voice, wind-gusted, trembled with grief and passionate anger; yet through that rage and sorrow rang a note of joy.

"Tell me, Leclair! Who, now?" demanded the Master, as he came close and peered down by the fire-gleam roaring on the beach, sending sheaves of sparks in comet-tails of vanishing radiance downwind with rushing sand.

"It is impossible, my captain," the lieutenant answered in French. His voice could now make itself heard more clearly; for here in the wady a certain shelter existed from the roaring sand-cyclone. "Impossible, but—*Dieu!*—it is true!"

"What is true?"

"Incredible, yet—*voilà!*"

"In Allah's name, lieutenant!" the Master ejaculated, "compose yourself! Explain! Who is this Arab, here?"

"No Arab, my captain! No, no!"

"Not an Arab? Well, what is he, then?"

"Ah, these scars, my captain! Behold—see the slave dress, the weals of the branding-iron on cheek and brow! Ah, for pity! See the starved body, the stripes of the lash, the feet mangled by the bastinado! What

horrible things they have done to him—ah, God have pity on us!"

Tears gleamed on the stern fighter's cheeks, there in the ghostly blue firelight—tears that washed little courses through the dust and sand now griming his face. The French airman, hard in battle and with heart of steel and flame, was crying like a child.

"What now? Who is it?" shouted the Master. "A European?"

"Yes, captain! A Frenchman!"

"A Frenchman. You don't mean to say it—is—"

"Yes, yes! My orderly! Lebon!"

"God!" exclaimed the Master. "But—"

A cry from Rrisa interrupted him, a cry that flared down-wind with strange, wild exultation. The Arab had just risen from the sand, near the unconscious, in-drifting form of the Sheik Abd el Rahman.

In his hands he was holding something—holding a leather sack with a broken cord attached to it. This cord in some way had been severed by the sheik's rifle when the old man had fallen. The leather sack had rolled a few feet away. Now, with hands that shook so that the Arab could hardly control them, Rrisa was holding out this sack as he staggered through the blinding sand-storm toward his chief.

"*Al Hamdu Lillah!*" (Praise to the Lord of the Three Worlds!) choked Rrisa in a strange voice, fighting for his very breath. "See—see what I—have found!"

Staring, blinking, trying to shelter his eyes against the demons of the storm, the Master turned toward him.

"What, Rrisa?"

Down into the wady stumbled the Arab, gray-powdered with clinging sand.

"Oh," he choked, "it has been taken from these *yesid*, these abusers of the salt! Now we rescue it from these cut-off ones! From the swine and brothers of the swine it has been taken by Allah, and put back into the hands of Rrisa, Allah's slave! See, Master, see!"

The shaking hands extended the leather sack. At it the Master stared, his face going dead white.

"Thou—dost not mean—?" he stammered.

"Truly, I do!"

"Not *Kaukab el Durri!*"

"Aye—it was lying near that heretic dog, my Master!"

"The Great Pearl Star, the sacred loot from the Haram?"

"*Kaukab el Durri,* Master. The Great Pearl Star itself!"

CHAPTER XXVI
The Sand Devils

WITH hands that quivered in unison with his nerves, now no longer impassive, the strange chief of this still stranger expedition took from Rrisa the leather sack. Over the top of the wady a million sand-devils were screeching. The slither of the dry snow—the white, fine snow of sand—filled all space with a whispering rustle that could be heard through the shouting of the simoom.

Sand was beating on them, everywhere, in the darkness lighted only by the tortured beach-fire. The stinging particles assailed eyes, ears, mouth, whitened clothing, sifted into hair, choked breath. But still the legionaries could not take shelter under their coats. In this moment of wondrous finding, they must see the gem of gems that Kismet had thus flung into their grasp.

The Master loosed a knot in the cord, drew the sack open and shook into his left palm a thing of wonder.

By the dim, fitful gleam of the fire, probably the strangest and most costly necklace in the world became indistinctly visible. At sight of it, everything else was forgotten—the wrecked air-liner, the waiting legion, the unconscious Arabs now being buried in the resistless charge of the sand-armies. Even poor Lebon, tortured slave of the Beni Harb, lay forgotten. For nothing save the wondrous Great Pearl Star could these three adventurers find any gaze whatever, or any thoughts.

While Leclair and Rrisa stared with widening eyes, the Master held up their treasure-trove.

"The Great Pearl Star!" he cried, in a strange voice. "*Kaukab el Durri!* See, one pearl is missing—that is the one said to have been sold in Cairo, twelve years ago, for fifty-five thousand pounds! But these are finer! And its value as a holy relic of Islam—who can calculate that? God, what this means to us!"

Words will not compass the description of this wondrous thing. As the Master held it up in the sand-lashed dimness, half gloom and half light, that formed a kind of aura round the fire—an aura sheeted through and all about by the aerial avalanches of the sand—the legionaries got some vague idea of it.

Three black pearls and two white were strung on a fine chain of gold. A gap in their succession told where the missing pearl had formerly been. Each of the five pearls was of almost incalculable value; but one, an iridescent Oman, far surpassed the others.

This pearl was about the size of a man's largest thumb-joint. Its shape was a smooth oval; its hue, even in that dim, wind-tossed light, showed a wondrous, tender opalescence that seemed to change and blend into rainbow iridescences as the staring legionaries peered at it. The other pearls, black and white alike, ranked as marvelous gems; but this crown-jewel of the Great Pearl Star eclipsed anything the Master—for all his wide travel and experience of life—had ever seen.

By way of strange contrast in values the pearls were separated from each other by worthless, little, smooth lumps of madrepore or unfossilized coral. These lumps were covered with tiny black inscriptions in archaic Cufic characters; though what the significance of these might be, the Master could not—in that gloom and howling drive of the sand-devils—even begin to determine.

The whole adornment, as it lay in the Master's palm, typified the Orient. For there was gold; there were gems and bits of worthless dross intermingled; and there about it was drifting sand of infinite ages, darkness, flashes of light, color, mystery, wonder, beauty.

"God! What this means!" the Master repeated, as the three men cringed in the wady. "Success, dominion, power!"

"You mean—" put in Leclair, his voice smitten away by the ever-increasing storm that ravened over the top of the gully.

"What do I not mean, lieutenant? No wonder the Apostate Sheik had to flee from Mecca and take refuge here in this impassable wilderness at the furthest rim of Islam! No wonder he has been hounded and hunted! The only miracle is that some of his own tribesmen have not betrayed him before now!"

"Master, no Arab betrays his own sheik, right or wrong!" said Rrisa in a strange voice. "Before that an Arab dies by his own hand!" He spoke in Arabic,

with a peculiar inflection.

Their eyes met a second or two by the light of the gusting fire.

"Right or wrong, *m'almé!*" repeated the Arab. Then he added: "Shall I not now go to drag in the swine-brother Abd el Rahman?"

"Thou sayst, if he be left there—"

"Yes, Master, he will surely die. All who are not sheltered, now, will die. All who lie there on the dune, will be drifted under, will breathe sand, will perish."

"It is well, Rrisa. Go, drag in the swine-brother. But have a care to harm him not. Thou wouldst gladly slay him, eh?"

"More gladly than to live myself! Still, I obey. I go, I bring him safe to you, oh Master!"

He salaamed, turned and vanished up over the edge of the wady.

The lieutenant, warned of the danger of sand-breathing for an unconscious man, drew the hood of the woollen *za'abut* up over the face of Lebon. There was nothing more he could do for the poor fellow. Only with the passage of time could he be reawakened. The French ace turned back to where his chief was still peering at the Pearl Star as he crouched in the wady, back to the storm-wind, face toward the fire on the beach.

"Do you realize what this thing is?" demanded the Master, turning the necklace in his hands. "Do you understand?"

"I have heard of it, my captain. For years vague rumors have come to me from the desert men, from far oases and cities of the Sahara. Now here, now there, news has drifted in to Algiers—not news, but rather fantastic tales. Yes, I have often heard of the *Kaukab el Durri*. But till now I have always believed it a story, a myth."

The Great Pearl Star

"NO myth, but solid fact!" exulted the Master, with a strange laugh. "This, lieutenant, is the very treasure that Mohammed gathered together during many years of looting caravans in the desert and of capturing *sambuks* on the Red Sea. Arabia, India, and China all contributed to it. The prophet gave it to his favorite wife, Ayesha, as he lay dying at Medina in 632, with his head in her lap.

"Next to the Black Stone, itself, it is possibly the most precious thing in Islam. And now, now with this Great Pearl Star in our hands, what is impossible?"

Silence fell between the two men. They still huddled there in the partial protection of the wady, while all the evil jinnee of the sand-storm shrieked blackly overhead. With no further words they continued to study the wondrous thing. The fire was dying, now, burned out by the fierce blast of the storm and blown away to sea in long spindrifts of spark and vapor, white as the sand-drive itself. By the fading light little could now be seen of the Great Pearl Star. The Master replaced it in its leather bag, knotted the cord securely about the mouth of the receptacle, and pocketed it.

A rattle of pebbles down the side of the wady, and a grunting call told them Rrisa had returned. Dimly they saw him dragging the old sheik over the lip of the gully, down into its half-protection. He brought the unconscious man to them, and—though bowed by the frenzy of the storm—managed a salute.

"Here, Master, I have saved him from the jinnee of the desert," Rrisa pantingly announced. His voice trembled with a passionate hate; his eyes gleamed with excitement; his nails dug into the palms of his hands.

"Now, Master, gladden my eyes and expand my breast by letting me see this old jackal's blood!"

"No, Rrisa," the Master denied him. "I have other use for the old jackal. Other punishments await him than death at my hands."

"What punishments, Master?" the Arab cried with terrible eagerness.

"Wait, and thou shalt see. And remember always, I am thy sheik, thy preserver, with whom thou hast shared the salt. He who violates the salt shall surely taste Jehannum!"

"Death shall have me, first!" cried Rrisa, and fell silent. And for a while the three men crouched in the wady with the two unconscious ones, torturer and victim. At length the Master spoke:

"This won't do, lieutenant. We must be getting back."

Leclair peered at him in the screaming dark.

"Why, my captain?" he asked. "The legionaires can care for themselves. If Nissr is breaking up, in the gale, we can do nothing. And on the way we may be lost. To retrace our journey over the desert would surely be to invite death."

"We must return, nevertheless. This storm may last all night, and it may blow itself out in half an hour. That cannot be told. The Legion may think us lost, and try to search for us. Lives may be sacrificed. Morale demands that we go back. Moreover, we certainly need not traverse the desert."

"How, then?"

"We can descend the wady to the beach, and make southward along it, under the shelter of the dunes."

"In the noise and confusion of the storm they may take us for Arabs and shoot us down."

"I will see to that. Come, we must go! Carry Lebon, if you like. Rrisa and I will take Abd el Rahman."

"Master, not Abd el Rahman, now," ejaculated Rrisa, "but Abd el Hareth!* Let that be his title!"

"As thou wishest, Rrisa. But come, take his feet. I will hold him by the shoulders. So! Now, forward!"

"And have a care not to breathe the sand, Master," Rrisa warned. "Turn thy face away when the sand-jinnee smite!"

Stumbling, heavy-laden, the three men made their painful way down to the beach, turned to the left, and plowed southward in deep sand. As they left the remains of the fire a great blackness fell upon them. The boisterous exultation of the wind, howling in from a thousand miles of hot emptiness, out over the invisible sea now chopped into frothy waves, seemed snatching at them. But the dunes at their left flung the worst of the sand-storm up and over. And though whirls and air-eddies, sand-laden, snatched viciously at them, they won along the beach.

That was lathering toil, burdened as they were, stumbling over driftwood and into holes, laboring forward, hardly able to distinguish more than the rising, falling line of white that marked the surf. Voices of water and of wind conclamantly shouted, as if all the devils of the Moslem Hell had been turned loose to snatch and rave at them. Heat, stifle, sand caught them by the throat; the breath wheezed in their lungs; and on their faces sweat and sand pasted itself into a kind of sticky mud.

After fifteen minutes of this struggle the Master paused. He dropped Abd el Rahman's shoulders, and

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*The former name signifies "Slave of Compassion"; the latter, "Slave of the devil."

Rrisa the sheik's feet, while Leclair stood silently bowed with the weight of Lebon and of the belaboring storm.

"Oooo-eeee! Ooooo-eeee! Oooooo-eeee!" the Master hailed, three long times. An answering shout came back, faintly, from the black. The Master bent, assured himself the old sheik's mouth and nose were still covered by the hood of the burnous, and cried: "Forward!" Again the three men stumbled on and on.

Five minutes later the Master once more paused.

"Remember, both of you," he cautioned, "not one word of the find!"

"The Great Pearl Star?" asked Leclair gruntingly. Their voices were almost inaudible to each other in that mad tumult. "That is to be a secret, my Captain?"

"Between us three; yes. Let that be understood!"

"I pledge my honor to it!" cried the Frenchman. Rrisa added: "The Master has but to command, and it is done!" Then once more they plowed on down the shore.

Only a few minutes more brought them, with surprising suddenness, to the end of the legionaries' trench. Trench it no longer was, however. All the paltry digging had been swiftly filled in by the sand-devils; and now the men were lying under the lee of the dunes, protecting themselves as best they could with coats over their heads.

They got up and came stumbling in confusion to greet the returning trio. Peering in the dark, straining their eyes to see, they listened to a few succinct words of the Master:

"Perfect success! Lethalizing was complete. Sand has buried the entire tribe. Leclair found his former orderly, who had been their slave. We have here their sheik, Abd el Rahman. Nothing more to fear. Down, everybody—coats over heads again—let the storm blow itself out!"

The Legion lay for more than an hour, motionless, waiting in the night. During this hour both Lebon and the old sheik recovered consciousness, but only in a vague manner. There was no attempt to tell them anything, to make any plans, to start any activities. In a Sahara simoom men are content just to live.

CHAPTER XXVII
Toil and Pursuit

BEFORE midnight the storm died with a suddenness even greater than that of its onset. Like a tangible flock of evil birds or of the spirits Victor Hugo has painted in "Les Djinns," the sand-storm blew itself out to sea and vanished. The black sky opened its eyes of starlight, once again; gradually calm descended on the desert, and by an hour after midnight the steady west wind had begun to blow again.

The "wolf's tail," or first gray streak of dawn along the horizon, found the Legion all astir. Lebon had long since been told of his rescue; he and his lieutenant had embraced and had given each other a long story—the enslaved man's story making Leclair's face white with rage, his heart a furnace of vengeance on all Islam.

The sheik, dimly understanding that these devils of Feringhistan had by their super-magic overwhelmed him and his tribe with sleep-magic and storm-magic of the strongest, lay bound hand and foot, sullenly brooding. No one could get a word from Abd el Rahman; not even Rrisa, who exhausted a wonderful vocabulary of imprecation on him, until the Master sternly bade him hold his peace.

A gaunt, sunken-eyed old hawk of the desert he lay there in the sand, unblinkingly defiant. Tortures and death, he felt, were to be his portion; but with the stoicism of the barbarian he made no sound. What his thoughts were, realizing the loss of tribesmen, capture, despoilment of the Great Pearl Star, who could tell?

A wondrous dawn, all mingled of scarlet, orange and vivid yellows, with streaks of absinthe hue, burned up over the desert world. It showed Nissr about as she had been the night before; for the simoom had not thrashed up sea enough—offshore, as it had been—to break up the partial wreck.

The air-liner had, however, settled down a good deal in the sand, and had canted at a sharp angle to port. Her galleries, fuselage and wings were heavily laden with sand that materially increased her weight; and to the casual eye she gave the impression of a bird which never again would soar on level wing.

The major voiced discouragement, but no one shared it. Spirits were still high, in spite of thirst and exhaustion, and of the losses already sustained in men and material. Lombardo and "Captain Alden" had patched up the wounded in rough, first-aid fashion; and they, in spite of pain, shared the elation of the others in the entire wiping-out of the Beni Harb.

As soon as the light permitted operation to begin again, the Legion trekked over to the Arabs' former lines. Nothing now remained to tell them of the enemy, save here or there the flutter of a bit of burnous or *cherchia* (head-dress), that fluttered from the white sand now all ribbed in lovely scallops like the waves of a moveless sea. In one spot a naked brown arm and hand were projecting heavenward, out of the sand-ocean, as if in mute appeal to Allah.

The legionaries heaped sand on this grim bit of death, completely burying it, and on the fluttering cloths. And as they peered abroad across the desert, in the glory of morning, now nothing could be seen to mind them of the fighting men who, like the host of Sennacherib, had been brushed by the death-angel's wing.

The jackals knew, though, and the skulking hyenas, already sneaking in the nullahs; and so did the *rion* and the yellow *ukab*-birds—carrion-fowl, both—which already from the farthest blue had begun to wheel and volplane toward the coast.

Back on the beach, exultant yet rather silent in the face of all that death, the Legion at once got itself into action under the vigorous command of the Master. Twenty-three men were still fit and active for service; and both Enemark and Lebon would in a few days be of help.

"Man-power enough," thought the Master, as he laid out his campaign. "The only troublesome factors are, first, Nissr's condition; second, our lack of water and supplies; and third, the possibility of interference from Arabs or European forces, by land or sea. If we can overcome all these—*if*, did I say? We can! We will!"

First of all, three volunteers swam out to Nissr through the surf now again beating in from the open sea. Their purpose was to bring the wounded Kloof ashore. Even though Kloof's oversight of the stowaway had wrecked the expedition, though Kloof would probably be executed in due time, common humanity dictated succoring him.

The volunteers returned, after a hard fight, with a body past any human judgments. Kloof, Daimamoto, Sheffield, and Bezier, all of whom had lost their lives in the battle with the Beni Harb, were soon buried on the beach by the hungry, thirsty, sand-penetrated legionaries. The shallow graves were piled with driftwood—rocks there were none, even in the wady, which was of

clay and gravel—and so, protected as best might be from beasts and birds, four of the Legion entered their long homes. The only ceremony over the fallen adventurers was the firing of a volley of six pistol-shots.

Swiftly returning heat, and a plague of black flies that poisoned with every bite, warned the legionaries not to delay. Hunger and thirst, too, scourged them on. Their first care was food and drink.

Fortune favored them. In spite of the simoom the prevailing west wind had cast up all along the shore—for two or three miles each way—perhaps a quarter or a third of the stores they had been forced to jettison. Before doing anything else, the Legion brought in these cases of provisions and established a regular camp in the wady where they would be protected from observation from the Sahara. The piling up of these stores, the building of a fire to keep off the flies, and the portioning-out of what little tobacco they had with them, wonderfully stiffened their morale.

Water, however, was still lacking; and all the legionaries, as well as the old sheik who would have died in the flames before asking for drink, were beginning to suffer extremely. The Master detailed Simonds, L'Heureux, and Seres to construct a still, which they did in less than three hours.

The apparatus was fearfully and wonderfully built, out of two large provision tins and some piping which they got—together with a few tools—by swimming out to the air-liner. The still, with a brisk fire under it, proved capable of converting sea-water into flat, tasteless fresh water at the rate of two quarts an hour. Thirsty they might all get, to desperation; but with this supply they could survive till better could be had.

While the distilling-apparatus was being built, work was already under way on Nissr; work which old Abd el Rahman watched with beady eyes of hate; work in which Dr. Lombardo, fellow-partner in Kloof's guilt, was allowed to share—the condition being frankly stated to him that his punishment was merely being deferred.

Under the Master's direction, stout mooring-piles of driftwood were sunk into the dunes, block-and-tackle gear was improved, and lines were rove to the airship. She was lightened by shoveling several tons of sand from her and by removing everything easily detachable; the men working in baths of sweat, with a kind of ardent abandon.

Enough power was still left in her storage-batteries to operate the air-pressure system through the floats. This air, with a huge boiling and seething of the white surf, loosened the floats from the cling of the sand; and a score of men at the tackles succeeded at high tide in hauling Nissr far up on the beach.

Rough gear, broken ship, toiling men blind with sweat, blazing African sun, appalling isolation, vultures and jackals at work behind the dunes, and—back of all—ocean and Sahara, made a picture fit for any master-painter. We must throw only one glance at it, and pass on.

This much accomplished, nightfall, with the west glowing like a stupendous jewel, brought rest. They camped in the wady, with machine-guns mounted and sentinels out. Abd el Rahman, liberated from his bonds and under strict surveillance, still refused to talk. No information could be got from him; but Rrisa's eyes brightened with unholy joy at sight of the old man ceremonially tearing his burnous and sifting sand on his gray head.

"Allah smite thy face, *ya kalb!*" (oh dog!) he murmured "Robber of the Haram, from Jehannum is thy body!"*

Rebuilding the Nissr

NIGHT passed with no alarm, quietly save for the yelping and quarreling of the jackals and hyenas at work beyond the dunes. Early morning found the legionaries again at work; and so for five days they toiled. The Legion was composed of picked men, skilled in science and deep in technical wisdom. With what tools still remained from the time when all surplus weight had been jettisoned, and with some improvised apparatus, they set vigorously to work repairing the engines, fitting new rudder-plates, patching up the floats and providing the burned propellers with metal blades.

Metal enough they had at hand, by cutting out dispensable partitions from the interior. And beavers never worked as these men worked in spite of the fierce smitings of the tropic sun. Even the wounded men helped, holding or passing tools. The Master labored with the rest, grimy, sweating, hard-jawed; and Captain Alden did her bit without a moment's slackening. Save for Abd el Rahman, now securely locked without any means of self-destruction in a stateroom, no man idled.

Anxiety dogged their every moment. Sudden storm might yet hopelessly break up the stranded air-liner. Other tribes might have seen the signal-fire and might descend upon the legionaries. Arab slavers might discover them, beating along the coast in well-armed dhows. Twice, in five days, lateen-sailed craft passed south, and one of these put in to investigate; but a tray of blanks from a machine-gun, at half a mile, turned the invader's blunt nose seaward again.

The greatest peril of all was that some news of the wreck might reach Rio de Oro and be wirelessed to civilization. That would inevitably mean ruin. Either it would bring an air-squadron swooping down, or battle-ships would arrive.

The Master labored doggedly to get his neutralizing apparatus effectively operating once more; and beside this, he spent hours locked in his cabin, working on other apparatus the nature of which he communicated to no one. But the Legion knew that nothing could save them from long-range naval guns, if that kind of attack should develop. They needed no urging to put forth stern, unceasing energies. Twice smoke on the horizon raised the alarm; but nothing came of it.

With great astuteness the Master had the wireless put in shape, at once, and sent out three messages at random, on two successive days. These messages stated that Nissr had been sighted in flames and falling, in N. latitude 19°, 35′; longitude 28°, 16′, or about two hundred and fifty miles northwest of the Cape Verdes; that wreckage from her had been observed somewhat south of that point; and that bodies floating in vacuum-belts had been recovered by a Spanish torpedo-boat.

No answer came in from any of these messages; but there was always an excellent chance that such misinformation would drag a red herring across the trail of pursuit.

Men never slaved as the legionaries did, especially toward the end. The last forty-eight hours the Master instituted night-work. The men paused hardly long enough to eat or sleep, but snatched a bite when they could, labored till they could do no more, and then

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* Alluding to the Arab superstition that every man's body is drawn from the place where it will eventually be buried. Rrisa's remark, therefore, was an Oriental way of wishing the sheik back into hell.

dropped in their places and were dragged out of the way so that others could take hold. Some fell asleep with tools in hand, stricken down as if by apoplexy.

The Master had wisely kept the pace moderate, at first, but had speeded up toward the end. None grew more haggard, toil-worn or emaciated than he. With blistered hands, sweat-blinded eyes, parched mouths and fevered souls these men fought against all the odds of destiny. Half-naked they strove, oppressed by heat, sun, flies, thirst, exhaustion. Tobacco was their only stay and solace. The Master, however, only chewed khat-leaves; and as for Captain Alden, she toiled with no stimulant.

It was 7.33 A. M., on the morning of the sixth day, that Frazier—now chief engineer—came to the Master, as he was working over some complex bit of mechanism in his cabin. Frazier saluted and made announcement:

"I think we can make a try for it now, sir." Frazier looked white and wan, shaking, hollow-eyed, but a smile was on his lips. "Two engines are intact. Two will run half-speed or a little better, and one will do a little."

"One remains dead?"

"Yes, sir. But we can repair that on the way. Rudders and propellers will do. Helicopters O. K."

"And floats?"

"Both aft floats repaired, sir. One is cut down a third, and one a half, but they will serve."

"How about petrol?" the Master demanded. "We have only that one aft starboard tank, now, not over three-quarters full."

"There's a chance that will do till we can run down a caravan along the Red Sea, carrying petrol to Suakin or Port Sudan. So there's a fighting hope—if we can raise ourselves out of this sand that clings like the devil himself. It's lucky, sir, we jettisoned those stores. Wind and current brought some of them back, anyhow. If they'd stayed in the storeroom they'd have all been burned to a crisp."

"Yes, yes. You think, then, we can make a start?" The Master put his apparatus into the desk-drawer and carefully locked it. He stood up and tightened his belt a notch.

"We can try, sir," Frazier affirmed grimly. Unshaven, haggard, dirty and streaked with sweat, he made a strange figure by contrast with the trim, military-looking chap who only a week before had started with the other legionaries, now no less altered than he.

"Very well," said the Master decisively. "Our prospects are good. The wounded are coming on. Counting Lebon, we have twenty-five men. I will have all stores reloaded at once. Be ready in one hour, sir. Understand?"

"Yes, sir!" And Frazier, saluting again, returned to the ravaged but once more efficient engine-room.

All hands plunged into the surf, wading ashore—for it was now high-tide—and in short order reloaded the liner. In forty-five minutes stores, machine-guns, and everything had been brought aboard, the cables to the posts in the beach had been cast off and hauled in, and all the legionaries were at their posts. The ports were closed. Everything was ready for the supreme test.

The Master was last to come aboard. Still dripping sea-water, he clambered up the ladder from the lower gallery to the main corridor, and made his way into the pilot-house. Bohannan was with him, also Leclair and Captain Alden.

The engines had already been started, and the helicopters had begun to turn, flickering swiftly in their turbine-tubes. The Master settled himself in the pilot's seat. All at once a buzzer sounded close at hand.

"Well, what now?" demanded the Master into the phone communicating with the upper port gallery.

"Smoke to southward, sir. Coming up along the coast."

"Smoke? A steamer?"

"Can't see, sir." It was the voice of Ferrara that answered. "The smoke is behind the long point to southward. But it is coming faster than a merchant vessel. I should say, sir, it was torpedo-boat or a destroyer, under forced draft. And it's coming—it's coming at a devil of a clip, sir!"

CHAPTER XXVIII
Onward Toward the Forbidden City

THE Master rang for full engine-power, and threw in all six helicopters with one swift gesture.

"Major," commanded he, as Nissr's burned and wounded body began to quiver through all its mutilated fabric; "major, man the machine-guns again. All stations! *Quick!*"

Bohannan departed. The droning of the helicopters rose to a shrill hum. The Master switched in the air-pressure system; and far underneath white fountains of spumy water leaped up about the floats, mingled with sand and mud all churned to frenzy under the bursting energy of the compressed-air released through thousands of tubules.

Nissr trembled, hesitated, lifted a few inches, settled back again.

Again the buzzer sounded. The noise of rapid feet became audible above in the upper galleries. Ferrara called into the phone:

"It's a British destroyer, sir! She's just rounded the point, three miles south. Signals up for us to surrender!"

"Machine-guns against naval ordnance!" gritted the Master savagely. "Surrender?" He laughed with hot defiance.

The first shell flung a perfect tornado of brine into air, glistening; it ricochetted twice, and plunged into the dunes. A "dud," it failed to burst.

Nissr rose again as the second shell hit fair in the hard clay of the wady, cascading earth and sand a hundred feet in air. Both reports boomed in, rolling like thunder over the sea.

"Shoot and be damned to you!" cried the Master. Nissr was rising now, clearing herself from the water like a wounded sea-bird. A tremendous cascade of water sluiced from her hissing floats, swirling in millions of sun-glinted jewels more brilliant even than the wondrous Kaukab el Durri.

Higher she mounted higher still. The destroyer was now driving in at full speed, with black smoke streaming from four funnels, perfectly indifferent to possible shoals, rocks or sand-bars along this uncharted coast. Another shell screamed under the lower gallery and burst in a deluge of sand near one of the mooring-piles.

"Very poor shooting, my captain," smiled Leclair, leaning far out of the port window of the pilot-house. "But then, we can't blame the gunners for being a bit excited, trying to bag a bit of international game like this Legion."

"And beside," put in Alden coolly, "our shifting position makes us rather a poor target. Ah! That shell must have gone home!"

Nissr quivered from nose to tail. A violent detonation flung echoes from sea and shore; and bits of splintered

wreckage spun down past the windows, to plunge into the still swirling, bubbling sea.

The Master made no answer, but rang for the propellers to be clutched in. Nissr obeyed their quickening whirl. Her altitude was already four hundred and fifty feet, as marked by the altimeter. Lamely she moved ahead, sagging to starboard, badly scarred, ill-trimmed and awry, but still alive.

Her great black shadow, trailing behind her in the water, passed on to the beach, across the sand-drifts where still little flutters of cloth showed from the burning stretch of tawny desert.

An Oasis

FLOCKS of vultures rose and soared away. Jackals and hyenas cowered and slunk to cover. The tumult of the guns and this vast, drifting monster of the air had overcome even their greed for flesh.

Another shot, puffing white as wool from the bow-chaser of the destroyer, screeched through the vultures, scattering them all ways, but made a clean miss of Nissr.

The airliner gathered speed as the west wind got behind her, listed her, pushed her forward in its mighty hands. Swifter, ever swifter, her shadow slipped over dune and wady, over hillock and nullah, off away toward the pellucidly clear-golden tints of the horizon beyond which lay the unknown.

Rrisa, at his gun-station, gnawed his fingers in rage and scorn of the pursuing Feringhi, and cried: "Allah make it hard for you! *Laan'abuk!*" (Curses on your fathers!)

Old Sheik Abd el Rahman, close-locked in a cabin, quivered, not with fear, but with unspeakable grief and amazement past all telling. To be thus carried away through the heavens in the entrails of the unbeliever's flying dragon was a thing not to be believed. He prostrated himself, with groans and cries to Allah. The legionaries, from galleries and gun-stations waving derisive arms, raised shouts and hurrahs.

Sweaty, spent, covered with grease and dirt, they cheered with leaping hearts.

Another shell, bursting in mid air not fifty yards away, rocked Nissr, keeled her to port, and for a moment sent her staggering down. She righted, lifted, again gathered speed.

More and more wild became the shooting, as she zigzagged, rose, soared into something like her old-time stride. Behind her the sea drew back, the baffled destroyer dwindled, the harmless shots crashed in.

Ahead of her the desert opened. Uncouth, lame, scarred by flame and shell, Nissr spread her vast wings and—still the eagle of the sky, undaunted and unbeaten—roared into swift flight toward the waiting mysteries of the vacant abodes.

Mid-morning found Nissr far from the coast, skimming along at 1,500 feet altitude over the Tarmanant region of the Sahara. The shell from the destroyer that had struck her had done no more than graze the tip of the starboard aileron, inflicting damage of no material consequence. It could easily be repaired.

For the present, all danger of any interference from any civilized power seemed to be at an end. But the world had discovered that Nissr and her crew had not yet been destroyed, and the legionaries felt that they must prepare for all eventualities. The stowaway's rash act was still big with possibilities of the most sinister import.

"This is probably just a temporary respite," said Bohannan, as he sat with the Master in the latter's cabin. The windows had been slid open, and the two men, leaning back in easy wicker chairs, were enjoying the desert panorama each in his own way—Bohannan with a cigar, the Master with a few leaves of "the flower of Paradise."

Now once more clean and a little rested, they had again assumed something of their former aspect. "Captain Alden," and as many others as could be spared from duty, were asleep. The Legion was already pulling itself together, though in depleted numbers. Discipline had tautened again. Once more the sunshine of possible success had begun to slant in through a rift in the clouds of disaster.

"It's still, perhaps only a temporary respite," the major was saying. "Of course, as long as we stay in the Sahara, we're safe enough from molestation. It's trying to get out—that, and shortage of petrol—that constitute our problem now."

"Yes?" asked the chief, non-committally. He peered out the window at the vast, indigo horizons of the desert, curving off to northward into a semi-circle of burnished blue. Here, there, the ethereal wonder of a mirage painted the sandy sea. Vast distances opened on all sides; the sparkling air, brilliant with what seemed a kind of suspended jewel-dust, made every object visible at an incredible remoteness. The wonder of that morning sun and desert could not be put in words.

"Our troubles are merely postponed," the Celt continued, gloomily. "The damage was done when that infernal destroyer sighted us. Just how the alarm was given, and what brought that sea-wasp racking her engines up the coast, we can't tell. But the cat's out of the bag now, and we've got to look out for an attack at any moment we try to leave this region."

"It's obvious my wireless message about being wrecked at sea won't have much weight now," the Master replied, analytically. "They would have, though, if that slaving-dhow hadn't put in to investigate us. I have an idea that those *jallahs* (slavers) must in some way have let the news out at Bathurst, down in Gambia. That's the nearest British territory."

"I wish they'd come within machine-gun fire!" growled the major, blowing smoke.

"Still, we've got lots of room to manoeuvre," the chief continued. "We're heading due east now," with a glance at the wall-compass and large-scale chart of Northern Africa. "We're now between Mauretania and Southern Algeria, bound for Fezzan, the Libyan Desert and Nubia on the Red Sea. That is a clear reach of more than 3,000 miles of solid desert"

"Oh, we're all right, as long as we stay in the desert," Bohannan affirmed. "But they'll be watching for us, all right, when we try to leave. It's all British territory to the east of us, from Alexandria down to Cape Town. If we could only make our crossing of the Nile and the Red Sea, at night—?"

"Impossible, major. That's where we've got to restock petrol. If it comes to a showdown, crippled as we are, we'll fight! Of course I realize that, fast as we fly, wireless flies faster. We may have to rely on our neutralizers again—"

"They're working?"

"Imperfectly, yes. They'll still help us, in civilized warfare. And as for what will happen at Mecca, if the Faithful are indiscreet enough to offer any resistance—"

"Got something new, have you?"

"I think it may prove something of a novelty, major. Time will tell, if Allah wills. Yes, I think we may have a little surprise for our friends, the Meccans."

The two fell silent again, watching the desert panorama roll back and away, beneath them. Afar, two or three little oases showed feathery-tufted palms standing up like delicate carvings against the remote purple spaces or against the tawny, seamed desolation that burned as with raw colors of fires primeval. Here, there, patches of stunted tamarisk bushes were visible. A moving line of dust showed where a distant caravan was plodding eastward over the sparkling crystals of an ancient salt sea-bottom. A drift of low-hanging wood-smoke, very far away, betrayed the presence of a camp of the Ahl Bayt, the People of the Black Tents.

The buzzer of the Master's 'phone broke the silence between the two men, a silence undertoned by the throb and hum of the now effectively-operating engines.

"Well, what is it?" the Master queried.

"Promising oasis, my captain," came the voice of Leclair from the upper starboard gallery. "Through my glass I can make out extensive date-palms, pomegranate orchards and gardens. There must be plenty of water there. We should take water, eh?"

"Right!" the Master answered. He got up and turned to Bohannan.

"Major," commanded he, "have Simonds and a crew of six stand by, in the lower gallery, to descend in the nacelle. Rrisa is to go. They will need him, to interpret. Give them a few of the trinkets from that assortment we bought for barter, and a little of our Arabic money."

"Yes, sir. But you know only two of the detachable tanks are left."

"Two will suffice. Have them both lowered, together with the electric-drive pump. Don't annoy me with petty details. You are in charge of this job, now. Attend to it!"

He passed into the pilot-house, leaned at the window and with his glasses inspected the deep green patch, dark as the profoundest sea, that marked the oasis. A little blind-village nestled there, with mud-brick huts, a watch-tower and a tiny minaret; date-grounds and fields of corn, melons and other vegetables spread a green fringe among the groves.

CHAPTER XXIX
"Labbayk"

AS Nissr slowed near the oasis, the frightened Arabs—who had been at their *ghanda*, or midday meal—swarmed into the open. They left their mutton, cous-cous, date-paste and lentils, their chibouques with perfumed vapor and their keef-smoking, and manifested extreme fear by outcries in shrill voices. Under the shadows of the palms, that stood like sentinels against the blistering sands, they bathed, with wild cries.

No fighting men, these. The glasses disclosed that they were mostly old men, women, children. Young men were few. The fighters had probably gone with the caravan, seen a while before. There came a little ragged firing; but a round of blanks stopped that, and sent the villagers skurrying back into the shelter of the palms, mimosas and jamelon-trees.

Nissr poised at 750 feet and let down tanks, nacelle and men. There was no resistance. The local *naib* came with trembling, to make salaam. Water was freely granted, from the *sebil*, or public fountain—an ancient tank with century-deep grooves cut in its solid stone rim by innumerable camel-hair ropes. The flying men put down a hose, threw the switch of the electric pump, and in a few minutes half emptied the fountain. The astonishment of the villagers passed all bounds.

"These be men of great magic," said the *naib*, to Rrisa, after the tanks had been hoisted to Nissr, and a dozen sacks of fresh dates had been purchased for the trinkets plus two *ryals* (about two dollars). "Tell me of these 'People of the Books!'"

"I will tell thee of but one thing, oh Abu Shawarib," (father of whiskers) answered Rrisa with pride. "Old Abd el Rahman is our prisoner in the flying ship above. We are taking him back to Mecca. All his people of the Beni Harb lie dead far toward the great waters, on the edge of the desert of the sea. The Great Pearl Star we also have. That too returneth to the Haram. *Allah ieelmak!*" (Thanks be to Allah).

The *naib* prostrated himself, with joyful cries, and touched lips and forehead with quivering fingers. All others who heard the news, did likewise. Fruits, pomegranate, syrup, honey and *jild el faras** were brought as offerings of gratitude. The crew ascended to the airliner amid wild shouts of praise and jubilation.

"You see, Leclair?" the Master inquired, as Nissr drew away once more to eastward, leaving the village in the palms behind. "We hold power already with the sons of Islam! What will it be when—?"

"When you attempt to take from them their all, instead of returning to them what they so eagerly desire to have!" the Frenchman put in. "Let us hope all for the best, my captain, but let us keep our powder very dry!"

Two days and one night of steady flying over the ocean of sand, with but an occasional oasis or caravan to break the appalling waste of emptiness, brought Nissr to the Valley of the Nile. The river of hoar antiquity came to view in a quivering heat-haze, far to eastward. In anticipation of possible attack, Nissr was forced to her best altitude, of now 4,700 feet, all gun-stations were manned and the engines were driven to their limit. The hour was anxious; but the Legion passed the river in safety, just a little south of the twentieth degree, near the Third Cataract. Bohannan's gloomy forebodings proved groundless.

The Red Sea and Arabia were now close at hand. Tension increased. Rrisa thrilled with a malicious joy. He went to the door of the captive sheik, and in flowery Arabic informed him the hour of reckoning was drawing near.

"Thou carrion!" he exclaimed. "Soon shalt thou be in the hands of the Faithful. Soon shall Allah make thy countenance cold, oh offspring of a one-eyed man!"

Three hours after, the airliner sighted a dim blue line that marked the Red Sea. The Master pointed at this, with a strange smile.

"Once we pass that sea," he commented, "our goal is close. The hour of great things is almost at hand!"

"Provided we get some petrol," put in Bohannan. "Faith, an open gate, that should have been closed, defeated Napoleon. A few hundred gallons of gasoline—"

"The gasoline is already in sight, major," smiled the chief, his glasses on the coastline. "That caravan—see there?—comes very a propos."

The Legion bore down with a rush on the caravan—

*Literally "mare's skin." Apricot paste in dried sheets, cut into convenient sizes. A great dainty among the Arabs.

a small one, not above fifty camels, but well laden. The cameleers left off crying *"Ooosh! Ooosh!"* and beating spitting beasts with their mas'hab-sticks, and incontinently took to their heels. Rrisa viewed them with scorn, as he went down in the nacelle with a dozen of the crew.

The work of stripping the caravan immediately commenced. In an hour some 500 tin cases of petrol had been hoisted aboard. On the last trip down, the Master sent a packet wrapped in wine cloth, containing a fair money payment for the merchandise. British goods, he very wisely calculated, could not be commandeered without recompense. The packet was lashed to a camel-goad which was driven into the sand, and Nissr once more got under way.

All eyes were now on the barren chalk and sandstone coasts of the Red Sea, beyond which dimly rose the castellated peaks of Jebel Rahah. At an altitude of 2,150 feet the airliner slid out over the Sea, the waters of which shone in the mid-afternoon sun with a peculiar luminosity. Only a few *sambuks* or native craft troubled these historic depths; though, down in the direction of Bab el Mandeb—familiar land to the Master—a smudge of smoke told of some steamer beating up toward Suez.

Leaning from the upper port gallery, the Master with Bohannan, Leclair and "Captain Alden," watched the shadow of the giant airliner sliding over the tawny sand bottom. That shadow seemed a scout going on before them, spying out the way to Arabia and to Mecca, the Forbidden City. To the white men that shadow was only a shadow. To Rrisa, who watched it from the lower gallery, it portended evil.

"It goes ahead of us, by Allah!" he murmured. "Into the Empty Abodes, where the sons of Feringhistan would penetrate, a shadow goes first! And that is not good!" He whispered a prayer, then added: "For the others, I care not. But my Master—his life and mine are bound with the cords of Kismet. And in the shadow I see darkness for all!"

"It is the Orient"

AT 4:27, Nissr passed the eastern shores of the Red Sea. Arabia itself now lay beneath. There exposed to their eyes, at length lay the land of mystery and fear. Bare and rock-ribbed, a flayed skeleton of a terraine, it glowed with wondrous yellow, crimson and topaz hues. A haze bounded the south-eastern horizon, where a range of iron hills jaggedly cut the sky. Mecca was almost at hand.

The Master entered his cabin and summoned Rrisa.

"Listen," he commanded. "We are now approaching the Holy City. I am bringing back the Apostate Sheik and the Great Pearl Star. I am the preserver of the Star. Your own people could not keep it. I have recovered it. Is that not true?"

"True, oh Master, praise to Allah!"

"It may be that I shall be called on to preserve some other and still more sacred thing. If so, remember that my salt is still in thy stomach."

"Master, I will not forget." Rrisa spoke dutifully, but his eyes were troubled. His face showed lines of fear, of the struggle already developing in his soul.

"Go thou, then! And remember that whatever happens, my judgment tells me it is best. Raise not a hand of rebellion against me, Rrisa, to whom thou owest life itself. To thy cabin—go!"

"But Master—"

"Ruchh'alla!" (Go now).

The Arab salaamed and departed, with a strange look in his eyes.

When he was gone, the Master called Bohannan and Leclair, outlined the next coup in this strange campaign, and assigned crews to them for implacably carrying out the plan determined on—surely the most dare-devil, ruthless and astonishing plan ever conceived by the brain of a civilized man.

Hardly had these preparations been made, when the sound of musketry-fire, below and ahead, drew their attention. From the open ports of the cabin, peering far down, the three legionaries witnessed an extraordinary sight—a thing wholly incongruous in this hoar land of mystery and romance.

Skirting a line of low savage hills that ruggedly stretched from north to south, a gleaming line of metal threaded its way. A train southbound for Mecca had halted on the famous Pilgrims' Railway. From its windows and doors, white-clad figures were violently gesticulating. Others were leaping from the train, swarming all about the carriages.

An irregular fusillade, harmless as if from pop guns, was being directed against the invading Eagle of the Sky. A faint, far outcry of passionate voices drifted upward in the heat and shimmer of that Arabian afternoon. The train seemed a veritable hornets'-nest into which a rock had been heaved.

"Faith, but that's an odd sight," laughed the major. "Where else in all this world could you get a contrast like that—the desert, a semi-barbarous people, and a railroad?"

"Nowhere else," put in Leclair. "There is no other road like that, anywhere in existence. The Damascus-Mecca line is unique: a Moslem line built by Moslems, for Moslems only. Modern mechanism blent with ancient superstition and savage ferocity that hold to the very roots of ancient things!"

"It is the Orient, Lieutenant," added the Master. "And in the Orient, who can say that any one thing is stranger than anything else? To your stations, men!"

They took their leave. The Master entered the pilot-house and assumed control. As Nissr passed over the extraordinary Hejaz Railway, indifferent to the mob of frenzied, vituperating pilgrims, the chief peered far ahead for his first sight of Mecca, the Forbidden.

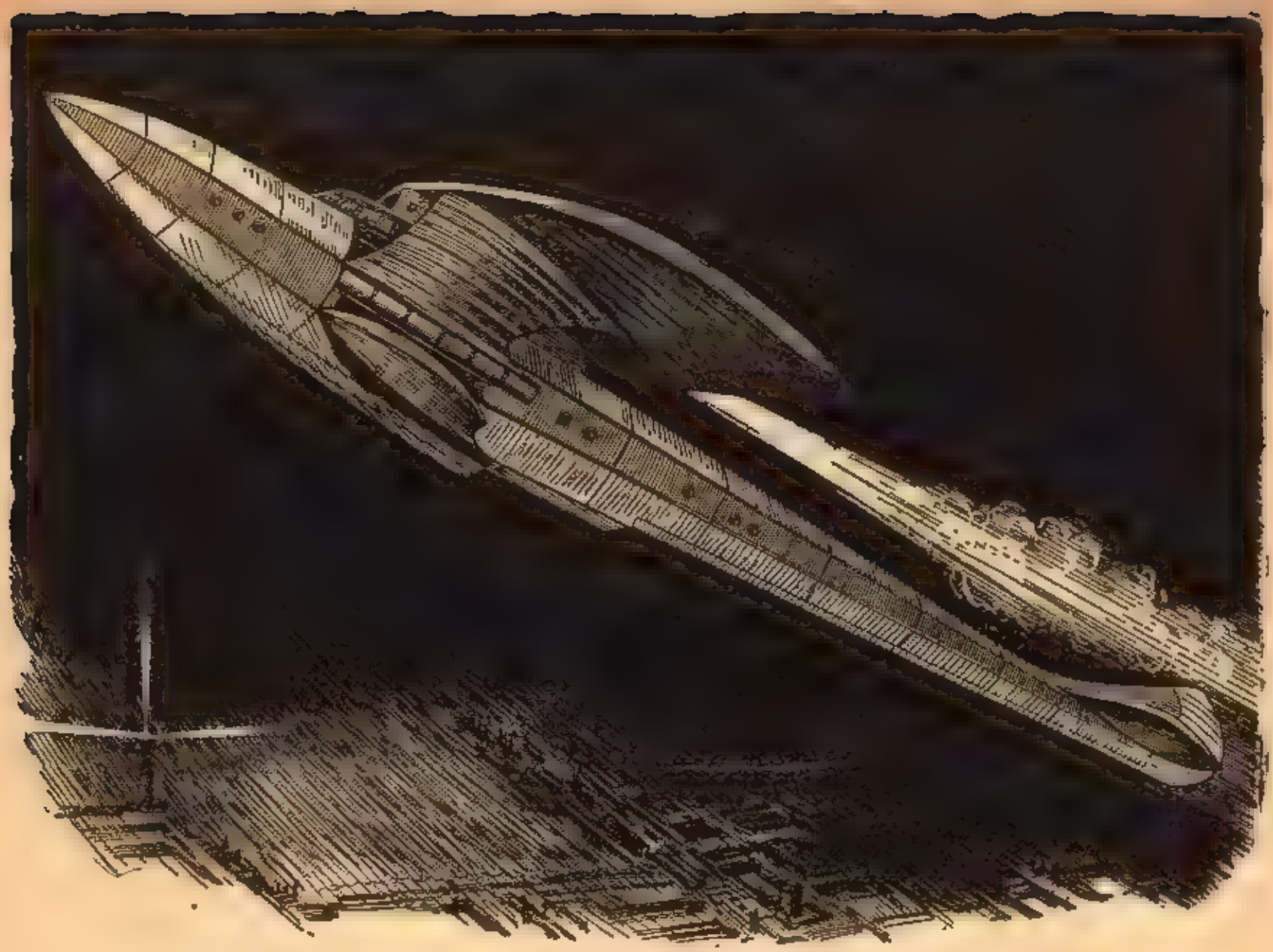
He had not long to wait. On the horizon, the hills seemed suddenly to break away. As the airliner roared onward, a dim plain appeared, with here or there a green-blue blur of oasis and with a few faint white spots that the Master knew were pilgrims' camping-places.

Down through this plain extended an irregular depression, a kind of narrow valley, with a few sharply isolated, steep hills on either hand.

The Master's eyes gleamed. His jaw set; his hand, on the controls, tightened till the knuckles whitened.

"The Valley of Mina!" he exclaimed. "Mount Arafat—and there, beyond, lies Mecca! *Labbayk! Labbayk!"* (I come).

(To be continued)



The start of the flight of the trans-oceanic rocket ship! It is now climbing to a 30-mile altitude.

BERLIN - - - *to* NEW YORK *In* ONE HOUR

By MAX VALIER
(Berlin)

(*Translated by Francis M. Currier*)

WITHIN a relatively short time, experiments in rocket flying with liquid fuel, undertaken by myself and, independently, by my former co-workers, Opel and Sander, will have reached a stage when we will be able to convince the world of the possibilities inherent in rocket-propelled airplanes

This, then, may be a fitting opportunity to consider the first significant and practical goal of rocket flight which I, as an inventor, have set for myself; and that goal is the traversing of the distance from Berlin to New York in an hour or so. I want to state, however, that it is no "speed mania" which impels me to set the traveling time so low; but it is a matter of the technical and economic necessities.

First, let us make clear the scientific and technical basis of the undertaking. For this, the giant flying machine "Dornier X," which has made such successful trial flights, may serve as a comparative example. Using the performance of the Dornier as a basis, we

may deduce some fundamental principles on which we can base calculations for our rocket flight across the ocean.

On a trial flight, the "DO-X," weighing about 23 tons empty, carrying a load of 50 tons, raised itself from the water by the application of 6,300 horsepower from the motors. Further, with its normal operating weight of 40 tons, the ship, with a propeller pull of 5,000 kilograms (11,000 pounds—one-eighth of the flying weight) can attain a speed of 254 kilometers (160 miles) an hour, or more than 70 meters a second.

It is only because it is impossible for propellers to give the machine a much greater pulling power, that the load and top speed of the "DO-X" are so limited. But let us endow the machine with rocket motors which furnish a tractive force equal at least, to the starting weight; then a rocket ship of about 18 tons weight empty, built like the "DO-X" (but without the heavy propeller motors) can surely carry a load of 80 tons. Since the buoyancy of the wings increases proportionately with the square of the speed of the plane, a machine with this load can, with a pulling power of 10,000 kilograms, be operated close to the surface of the sea at a speed of 360 kilometers an hour, or 100 meters a second.

MAX VALIER

IF anyone had seriously predicted ten years ago that hard-headed engineers and scientists were proposing a trip from Berlin to New York in one hour, their sanity would probably have been questioned.

Such, however, are the rapid advances of science that within the next few decades a trip from Berlin to New York will actually have taken place in an hour or less.

We are particularly happy to present an article by the famous Max Valier, a co-worker of the now illustrious Von Opel and Sander, the creators of the Von Opel rocket-propelled airplane.

Herr Valier stands among the foremost of present day rocket technicians and whatever he writes must be read with respect. As the opinions of an expert, therefore, we are certain that the present article will create nothing less than a sensation.

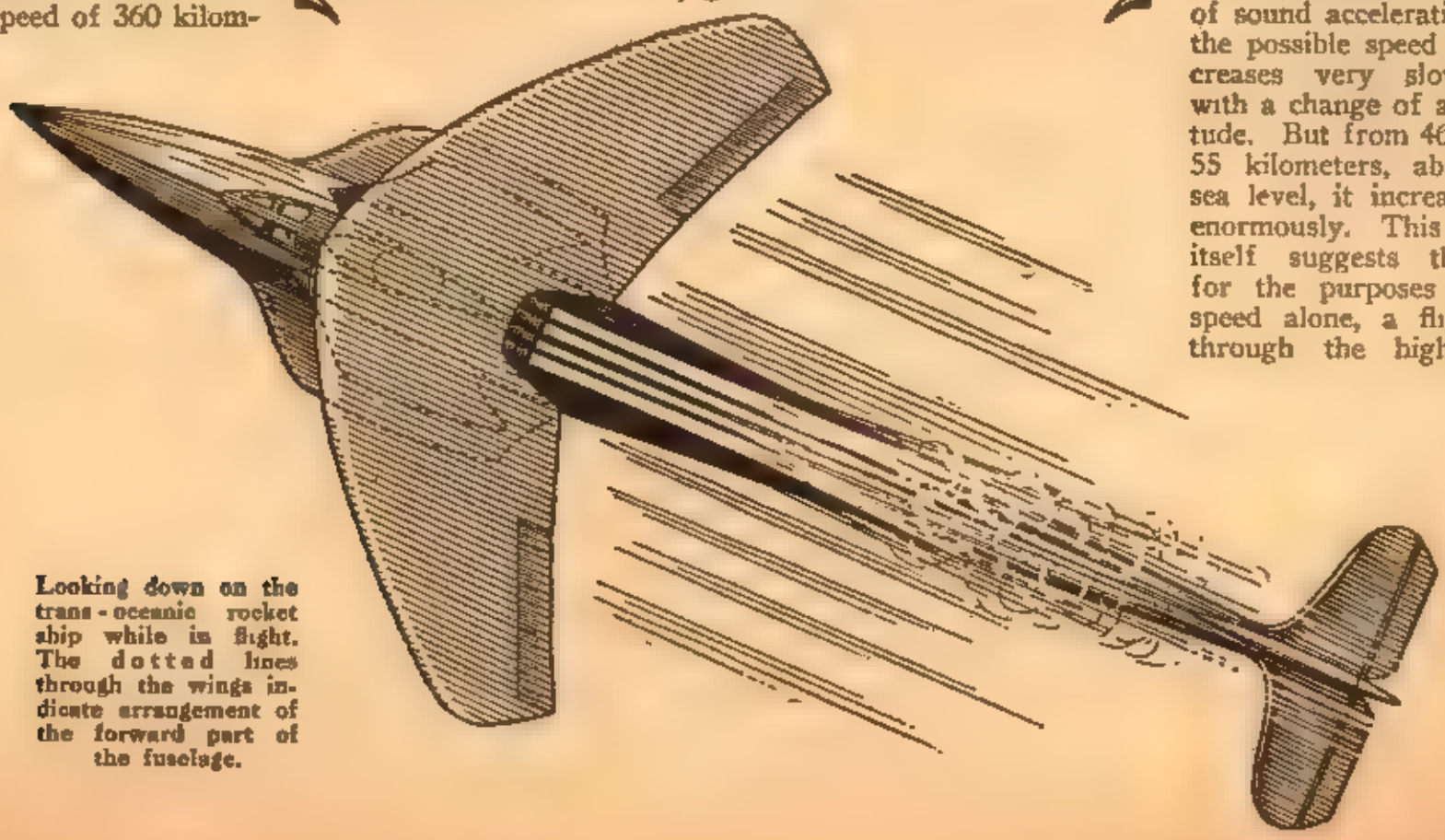
The following table will make clear the comparison between the "DO-X" as now propelled and when propelled by rockets.

	"DO-X"	Rocket
Wt. empty (tons).....	23	18
Wt. loaded (tons).....	73	98
Propulsion (lbs.)	11,000	22,000
Horsepower	6,300	.....
Speed (km/hr.)	254	360

Now, taking into consideration the decrease in the density of the air, and therefore its lessened friction, with increasing altitude, we can at once derive, for every altitude, the speed which produces an equal lifting power —and for our assumed propelling forces. There results the following table, perhaps surprising to those who have not given the subject much study:

Alt. km.	Alt. miles	Speed met./sec.	Speed miles/hr.
0	0.00	100	223 7
11	6.84	200	447.4
20	12.23	300	671 1
31	19.07	400	894.8
33	20.53	500	1118.5
37	23 01	750	1677.7
40	24.85	1000	2236 9
46	28.58	1500	3355.4
50	31.07	2000	4474 0
55	34.18	3000	6710.8

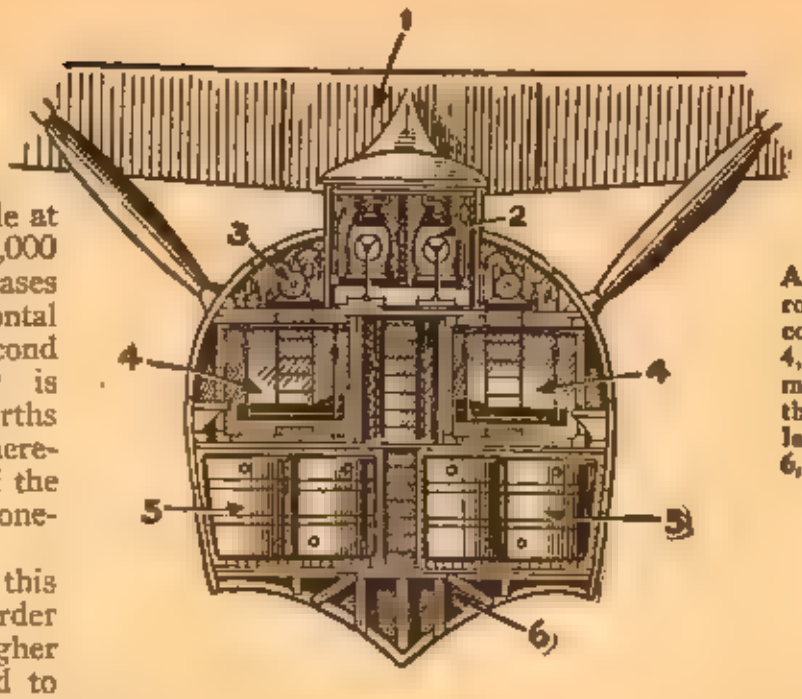
From this it is evident that, in the lower thirty kilometers of our ocean of atmosphere, partly because of the density of the air and partly because of the so-called zone of sound acceleration, the possible speed increases very slowly with a change of altitude. But from 46 to 55 kilometers, above sea level, it increases enormously. This in itself suggests that, for the purposes of speed alone, a flight through the highest



Looking down on the trans-oceanic rocket ship while in flight. The dotted lines through the wings indicate arrangement of the forward part of the fuselage.

layers of the stratosphere is advisable. But it indicates something else.

We perceive that, at an altitude of 46 kilometers, a speed of 1,500 meters a second is attained there; while at 50 kilometers the speed is 2,000 meters a second. In both cases the power required for horizontal flight is the same. In the second case, however, the power is needed for only three-fourths of the time of the first.. Therefore, by saving one-fourth of the time, we save, likewise, one-fourth of the fuel.



A cross section in the trans-oceanic rocket ship. 1, the wings; 2, the control room; 3, the fuel pumps; 4, the passenger cabins with hammocks. These are necessary when the changes in velocity are particularly violent. 5, Tank rooms; 6, keel, partitioned off by bulkheads.

Of course, we cannot carry this idea to an extreme; for, in order for the ship to travel at the higher speed, it must first be raised to the greater height and also be accelerated to this greater speed. Therefore, what one would gain in the horizontal flight across the ocean he would lose by lifting the craft to a greater height and accelerating to a greater speed. In fact, we shall probably not exceed by any appreciable amount a speed of 2,000 meters a second; because otherwise the net expenditure of fuel would be too great. The "ceiling" will, similarly, be found at an altitude of 50 kilometers.

The next subject to consider is the landing. The proper landing should be in a long glide, which also has the effect of a brake. Therefore the pilot must so set the course that the ship is allowed to sink into lower layers of air coincidentally with the reduction in speed when the rocket motor is shut off. This reduction will take place as the plane encounters greater air resistance. Calculation shows that, considering all circumstances, the glide will have a length of approximately 1,900 kilometers (1,180 miles) and will last 20 minutes. The braking effect will then take place gently and imperceptibly, increasing only toward the end. The actual landing must be managed in the same way and at the same low speed as in the present flying machines. This will be safer, since the ship, after using up all the fuel, will arrive with only its own weight, plus the relatively small load of passengers, crew and necessities.

The ascent of the rocket machine will probably not be so wildly romantic as writers on space travel are accustomed to describe it. A rate of acceleration which almost crushes the passengers is not thought of, because it will be impossible, for a long time hence, to operate a rocket-propelled flying machine with a greater starting force than 80 tons—equivalent to the weight of the plane. Since one-fourth of this force is used to overcome air resistance, and another fourth in sending the machine upward (supported, as it were, by the air) at an average slope of 1:4, there remains for the acceleration at the beginning a propulsive force equal to only forty tons, or half the starting weight. This would permit no greater increase in speed per second than is possible in a powerful motor car. It is only later in the flight, when the weight has been greatly decreased by the consumption of fuel, that we can attain really great speeds, and an acceleration equal to that of gravity; but even this, for the passengers, will be hardly more thrilling than the enjoyment experienced in a roller coaster.

To ascend to the proper altitude and acquire the maximum horizontal speed would take about five minutes. The ship in this time would cover a horizontal distance of about 400 kilometers (248 miles). Adding the 1,900 kilometers of glide, makes 2,300 kilometers; which leaves, of the entire distance of 7,200 kilometers (4,474 miles) only 4,900 kilometers (3,044 miles) of horizontal travel. At a speed of 2,000 meters a second, this will be covered in 2,450 seconds, or 41 minutes. Therefore, the total flying time from Berlin to New York is calculated at one hour and six minutes.

From the technical standpoint, the most vital question is, whether sufficient fuel can be carried. There is needed, in the initial stretch, power not only to overcome air resistance, and to lift the machine, but also to give an average speed of about 2,500 meters a second. With present available fuels, this means that, with 80 tons starting weight, only 46 tons will reach the beginning of the horizontal stretch at the 50 kilometer altitude, 34 tons already having been used up in fuel. Then, at the start of the horizontal stretch of 4,900 kilometers, we have still available the 24 tons of fuel which are needed to cover this distance. This assumes that the rocket gases have an expulsion speed of 4,500 meters a second, which is actually attainable. The ship then enters the glide weighing only 22 tons.

If it is assumed that the weight of the ship empty is 20 tons, then only two tons of load could be taken along. If it is possible to reduce the weight of the empty ship, then every ton so reduced is clear gain. From this it is evident that the rocket flight from Berlin to New York would pay, at present, only in the case of high-speed mail. Indeed, for somewhat shorter distances, say from Ireland to New York, a load could be carried that would be considerably more profitable.

In the sensations of the passengers, the flight in the rocket ship, according to the plan described, would differ almost not at all in the start and landing from that in an ordinary plane. There would be no condition of weightlessness, even during the long horizontal stretches; the normal terrestrial gravity remains unchanged. Furthermore, because the ships will have wings, even with motors shut off there will be no free fall to the earth. The wings sustain the plane considerably, even on the glide.

Therefore, if proper care is taken to provide warmth and fresh air in the passenger cabins of the trans-oceanic rocket ship, there is no reason why the trip should not be as comfortable as in an ordinary plane.

But let me say that a great many illusions about rocket flying will be destroyed, even in connection with the impressions of the trip. Of the region over which one rises, almost nothing will be seen; because of the vapor and the very light cloud formations so prevalent in the higher strata. During the speedy flight over the ocean, at the highest altitudes, almost nothing will be seen of the ocean, or, for that matter, of the earth. The richest reward of the passengers will be in the sight of the black sky, while the sun (as in total eclipses) will appear surrounded by glowing red protuberances and the silvery corona.

In conclusion, let me ask: Why should we strive to reach those heights, which are as full of icy horror as the world is of living warmth? Why must we travel ever faster in a seemingly insatiable desire to conquer space and time?

The answer is simple.

The answer is that living means fighting, not sleeping and dreaming—a word of double significance. Progress, for the human race, is possible only through the ever-increasing achievements of science.

THE END

The Second

SCIENCE WONDER QUARTERLY

contains a tremendous interplanetarian science fiction novel entitled:

"The Moon Conquerors"

By R. H. ROMANS

Here we have a story which is vastly different from the "Shot Into Infinity" in the Fall issue of the QUARTERLY.

The author, Mr. Romans, an astronomer of no mean accomplishments, has taken a number of years to write this book, and it is published in its entirety in the Winter QUARTERLY. A number of most astounding inventions have been made by the author, and the story is really three books in one. With a logic that is at times overwhelming, it pictures a tremendous lunar civilization; and the picturization is so realistic and so overpowering, that you live with the story. There is never a minute when the author departs from the probable or the possible; for his science is always within the bounds of reason, and the logic keeps the pace with the adventure part of the story.

We unhesitatingly state that this is the greatest "moon" story that has ever been written, and you will pronounce it as such when you have read it.

Don't miss this epic of interplanetarian science fiction.

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"The Osmotic Theorem," by Capt. S. P. Meek, U.S.A.
"Into the 28th Century," by Lilith Lorraine
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IN THE WINTER SCIENCE WONDER QUARTERLY

Now On All Newsstands

WHAT IS YOUR KNOWLEDGE OF AVIATION?

Test Yourself by This Questionnaire

THE questions given below are taken from the stories in this issue. They will serve, by your ability to answer them, to test yourself in your knowledge of aviation. By thus testing yourself, you will be able to fix in your mind a number of important facts of aviation that are presented by the stories.

The pages, on which the answers are given, follow each question.

1—What is the approximate "pulling power" of propellers in proportion to the weight of the plane? (Page 745)

2—What is the relation of the speed of an airplane to the buoyancy of its wings? (Page 745)

3—Up to what altitude above sea level is the acceleration of a flying machine hampered most by atmospheric density? (Page 745)

4—What happens to a plane if the magneto of the engine goes dead? (Page 717)

5—What action does a plane take when the "stick" is pushed forward? (Page 694)

6—What apparatus must pilots carry if they expect to reach very high altitudes? (Page 700)

7—What weather conditions are indicated by decreased pressure as shown by a falling of the mercury in a barometer? Page 706)

The Vanishing Fleet

(*Continued from page* 691)

to the contrary you might have the cook bake a big cake and also have a justice of the peace on hand."

Outside, Lieutenant Evenrude was waiting and fell upon the captain like a hungry bear. He told briefly how he had been captured and then plied Gauthier with questions. "What is all this about invisible ships? Is that the invention you were working on?"

"Yes. I have been thinking that our old way of nullifying gravitation by insulating the potential energy, and then absorbing potential energy from the central storehouse, was too cumbersome. I reasoned that, if I could find a way to orient the axes of the molecules comprising the ship in a direction different from that of ordinary three-dimensional substances, that a new and unknown arrangement of matter would result—an arrangement that would be unaffected by three-dimensional light. Thus, it would be invisible and would not have an inter-gravitational attraction with our three-dimensional masses. I worked it out mathematically, and I see they have proved it in practice."

Between compliments Gauthier watched the stolen ships taken from their underground prison by their original crews and the prisoners and passengers taken aboard.

The ex-monarch, his wrists in irons, passed close by. He looked at the captain for a moment.

"I think that this disproves your statement that I would some day stumble over a mistake of my own making," he said with an air of amusement, despite his downfall.

Gauthier smiled! "As I see it, you made two big mistakes. First you failed to realize that an advancing civilization is always a step ahead of its imitators, such as yours. And your biggest mistake was that you selected the wrong girl to be your queen."

And Bernadine smiled proudly at her captain.

THE END.

Liners of Space

(*Continued from page* 713)

"To the shuttle!" yelled Joslin. And indeed this seemed the only avenue to escape left open. Quickly the trap door to shuttle number one was banged open. The eight quickly entered and the door was once more bolted shut. A minute later they were flung free from the doomed vessel. Quickly the shuttle was reversed and turned away from the *Barta*. The last they saw of that wonderful ship, she was headed directly toward the blinding glare of the sun.

Little remains of the story of the mysterious liner and her mad commander. In due time the shuttle was picked up by a Venusian liner bound for the Earth.

And although the great *Barta* itself was lost forever, the shuttle proved invaluable to the staff of Inter-Stellar Lines. Technicians are now working on a new design of car which will embody the propulsion and gravity-nullifying principles of Doctor Sigurd.

And the six men who experienced those thrilling days in that mad race toward Mercury are to become the crew of the new *Martian II*.

THE END.

One Hundred Dollars in GOLD

A few moments of your spare time NOW may bring you $100.00 in GOLD!

WE want a catchy slogan for this magazine. Slogans are used universally in many different lines of business, and we believe that this magazine should be known by its own slogan.

Such slogans as "NOT A COUGH IN A CARLOAD"; "GOOD TO THE LAST DROP"; "SAY IT WITH FLOWERS," etc., are well known. A number of magazines have already adopted slogans, such, for instance, as "Popular Mechanics," with "WRITTEN SO YOU CAN UNDERSTAND IT."

We are offering $100.00 for a novel, as well as descriptive, catchy phrase; which we shall use after the end of the contest as a permanent slogan of this magazine.

REMEMBER, THERE IS NOTHING TO BUY OR TO SELL! You have an equal chance to win this prize, regardless of whether or not you are a subscriber. The contest is open to all. Get your friends in on this and, if they give you suggestions, you may split the prize with them, if you so desire.

To win the $100.00 prize, you must submit only a single slogan, ONE ONLY. It must be an original idea. It makes no difference who you are or where you live, whether in this country or not; anyone may complete in this contest and you may be the winner.

Look this magazine over carefully and try to find out what it stands for, what its ideals are, and what it tries to accomplish. Then try to put all of your findings into a slogan which must not, under any circumstances, have more than seven words.

After you have the idea, try to improve upon it by shortening the slogan and making it sound more euphonious; but always remember that it is the idea which counts. The cleverer the slogan, and the better it expresses the ideas for which this magazine stands, the more likely are you to win the prize.

No great amount of time need be spent in the preparation of slogans. Start thinking right now and jot down your thoughts. Also tell your friends about it, and get them to submit slogans of their own, or compose one in partnership with them.

for a SLOGAN for

AIR WONDER • STORIES

Here are a couple of sample slogans; which are given as mere suggestions, AND NOT TO BE USED AS ENTRIES:

"THE MAGAZINE FOR AIR-SCIENCE FANS"

"SCIENCE AVIATION OF THE FUTURE"

RULES FOR THE CONTEST

(1) The slogan contest is open to everyone except members of the organization of AIR WONDER STORIES and their families.

(2) Each contestant may send in only one slogan; no more.

(3) Slogans must be written legibly or typed on the special coupon published on page 759 of this magazine. (If you do not wish to cut the magazine, copy the coupon on a sheet of paper exactly the same size as the coupon.) Use only ink or typewriter; penciled matter will not be considered.

(4) Each slogan must be accompanied by a letter stating in 200 words, or less, your reasons for selecting this slogan.

(5) In case of duplication of a slogan, the judges will award the prize to the writer of the best letter; the one which, in their opinion, gives the most logical reasons for the slogan.

This contest closes on May 1, 1930, at which time all entries must be in this office; and the name of the winner will be announced in the July, 1930, issue of AIR WONDER STORIES, on publication of which the prize will be paid.

Because of the large number of entries which may be expected, the publishers cannot enter into correspondence regarding this contest.

Address all communications to:

Editor, Slogan Contest
Care of AIR WONDER STORIES
96-98 Park Place New York, N. Y.

AVIATION NEWS OF THE MONTH

CONSTRUCTION

New Rossi Plane Has Great Lifting Power

ACCORDING to Arnaldo Cortesi, writing in the *New York Times*, Giuseppe Rossi, famous Italian aviator, has just completed a new large tri-motor seaplane which is considered one of the most perfect creations aeronautical science has yet achieved.

The outstanding feature of the new seaplane—one in which it is superior to other planes—is the unusually heavy load it can lift, in relation to its own weight. It is designed to lift a load equal to, and even greater than, its own weight when unloaded. These qualities have been proved in test flights.

The Rossi machine is a tri-motor biplane, driven by three Isotta-Fraschini engines of 500 h.p. each. Underslung from the lower plane is a very seaworthy and totally-enclosed boat 159 feet in length, capable of seating thirty-four passengers and a crew of six, and of carrying sufficient fuel for a 1000-mile flight.

The machine can take off with a total load of 6½ tons, equal to its own weight when unloaded.

German Automatic Pilot Said to Fly Curves

A GERMAN automatic pilot has been reported which excels in efficiency the Sperry gyroscope stabilizer in use here. The device developed by the Messgeraete Boykow G. M. B. H., of Berlin-Lichterfeld, will stabilize an airplane automatically on the lateral, longitudinal, and vertical axes.

The new pilot controls the plane better than a human pilot can, and in this respect resembles the American and English stabilizers. It is claimed also, that attitude may be regulated by anyone in the cabin of the plane. The nose of the ship goes up and down depending upon the operator, and when a button is pressed actuating the 'curve switch' the ship will fly three kinds of curves, either the right or the left, a flat curve, a medium curve or a sharp curve. Again, when the curve switch button is actuated the ship will resume a direct course. According to reports, this simple navigating includes gaining and losing altitude, straight-ahead and curve flying, even for an indefinite time during which the pilot need not concern himself.

Stock Models Perform Well in Safe Aircraft Competition

By CAPT. THOMAS CARROLL
Test Pilot for the Daniel Guggenheim Safe Aircraft Competition

(Copyright 1929 by Science Service)

ALTHOUGH the rigorous test routine of the Guggenheim safe aircraft competition demands highly specialized designs, a number of manufacturers have quite intelligently entered stock model airplanes which, unexpectedly, have shown very excellent performance under the rules of the competition. It is hardly to be expected that many or possibly any, of these types will actually meet the full program of qualifying tests, but it is indicative of the high quality of the American design. Among these types should be mentioned the Command-Aire 3C3 and the Alexander Eaglerock. Some of these same airplanes which undoubtedly fall somewhat into the low-price class have, at the performance in the way of carrying ability and high speed that could be reasonably termed of them. That these structures are strong and humble is assured by the Department of Commerce approved type certificates. In addition, the characteristics in stability and maneuverability, particularly in slow-speed flight are exceptionally good. Because of careful adherence to the best standards in wing design they do not, when pulled up to speed bordering on the stall, show a tendency to whip off into a spin or any such other dangerous or uncomfortable condition, but may be maintained in a slow speed condition with very good control throughout.

Handley-Page Bid for Safety Prize Analyzed

By CAPT. THOMAS CARROLL
Test Pilot for the Daniel Guggenheim Safe Aircraft Competition

(Copyright 1929 by Science Service)

THE first airplane to be received in a condition which would permit of its being tested in the Guggenheim safe aircraft competition, was the Handley-Page entry of British origin. This little airplane, to the lay eye, does not look much different from many planes which are customarily seen in the air. It is a small, two-seater biplane, equipped with a five-cylinder Armstrong Siddeley engine. To all outward appearance, it is quite normal.

It does, however, fulfil the minimum requirements of being able to carry the specified load at the minimum top speed of 110 miles per hour, or better. Very complete and intelligent application however, has been made to the problem of slow speed and this has been accomplished by a combination of the Handley Page slot with so-called 'flap gears.' The slot is formed by the moving forward of a small wing, which normally, in the high speed condition, lies flush upon the surface of the entering edge of the main wing. The flap is a movable portion of the rear of the wing hinged similarly to an aileron, and the slot and flap are geared together in such a fashion that the movement of one actuates the other. In flight, when a high angle of attack is reached, the air forces upon the forward part of the wing are such as to displace the small wing forward leaving between it and the main wing an opening through which the flow of air is actuated. Then, being connected with the flap, the forward opening of the slot airfoil automatically moves the flap in a downward direction, increasing the camber and the effectual angle of attack. The application of this slot and flap changes the lift factor of the whole wing to an extent which permits of its being flown at a very much greater angle of attack than with ordinary wings, and a greater lifting force is developed.

Unusual Hinged Wing Marks Safety Contest Airplane

By CAPT. THOMAS CARROLL
Test Pilot for the Daniel Guggenheim Safe Aircraft Competition

(Copyright 1929 by Science Service)

THE Cunningham-Hall airplane entered in the Guggenheim safe aircraft competition is an ingenious craft. The little airplane is designed around the very unusual Hall wing. This wing is one in which the normal contours are maintained when in normal flight, but for slow-speed operation, by means of a manual control, the rearward half of the wing is hinged and turned down to a large angle of attack. This gives a condition of increased camber but, in addition to that, there is uncovered a long opening on the underside of the front part of the wing which permits air to flow through the inner part of the wing, and is discharged across this downward flap to the rear. It has then the doubly-effective advantage of both increased camber and boundary-layer control, which insures a maintenance of high lift in the slow and high angle of attack condition.

Curtiss *Tanager* Contender for Safety Prize

By CAPT. THOMAS CARROLL
Test Pilot for the Daniel Guggenheim Safe Aircraft Competition

(Copyright 1929 by Science Service)

THE *Tanager* which has arrived at Mitchel Field to fly in the Daniel Guggenheim safe aircraft competition, is the Curtiss entry and was constructed at Garden City, Long Island. Prior to its submission it was tested by the Curtiss test pilot Paul Boyd whose terse comment upon its performance is: "We believe that it will meet the requirements of the competition."

The airplane is of cabin type, carrying a pilot and passenger in tandem within the enclosure. It is a rather large biplane, equipped with the Curtiss *Challenger* engine, the type which recently carried O'Brien and Jackson to the world's endurance record. The wings are equipped with a modification of the Handley Page slot. In addition, flaps (the hinged rear portions of the wings) are independently and manually operated, allowing their position to be fixed by means of a chain gear in any position at the will of the pilot. The landing gear is the familiar combination of rubber in compression, and a long-travel 'oleo' gear which permits of a landing gear travel of more than one foot. It is, of course, equipped with wheel brakes operated by individual pedal gear.

An interesting innovation in its landing-gear design is that the travel of the shock absorbers is restricted in taking off in order to assure the landing gear's leaving the ground in the shortest possible distance, rather than trailing along the ground because of its extension as the load is reduced. The gear is placed in full action before landing, in order that the full use of the shock absorber may be had.

A most unusual and interesting feature is the full floating ailerons. These are of the wing-tip design, similar in many ways to the old Curtiss interplane ailerons which in that earlier case were placed between the wings, but in this particular application at the tips of the lower wings. These are floating, and in the free position, trail at a zero angle with the relative wind. They are however, independently operated in the usual aileron fashion around this trailing position. An aileron control is provided which is entirely independent of the wings, and which, whether the wings might be stalled or not is never in a stalling condition, though always being displaced from the zero angle of attack position for lateral control.

British Launch Giant Flying Boat

THE Royal Air Force has launched a new giant all metal flying boat, named the *Iris III*. The seaplane, one of the largest in the world, is not very similar to the great Z-R-3 in size. It weighs thirteen tons, has a crew of nine and carries twenty-eight persons. The distinguishing characteristic of the new flying machine is its all metal construction. It is the largest all metal seaplane in the world and the forerunner of still larger ships which have been ordered by Great Britain.

English Robot Pilot Steers Planes

AN automatic piloting mechanism for planes has now been perfected in England. This device, the result of years of development by the technicians of the Royal Air Force, has been successfully tried out in various types of planes—two-seater day bombers, large twin-engine night bombers, and big flying boats. It is being considered as a second or relief pilot for long-distance flights.

In every test the robot pilot has steered an accurate course for hours at a time, over distances up to 400 miles, while the human members of the crews were occupied in other work. The basis of the mechanical pilot is a gyroscope which controls pistons connected with the rudder and elevators of the plane; these pistons are actuated by compressed air. Once a course is set, the robot pilot, similar in principle to the Sperry gyroscope stabilizer used here, keeps the machine on its route, and errors of even a fraction of a degree are instantly and automatically detected and corrected. All the human pilot has to do with the robot-equipped plane is to take off and land the machine.

The new device, known as "The Pilot's Assistor," weighs about [illegible] pounds. In actual fog and clouds when a human pilot would have found it almost impossible to maintain straight or level flight because of the absence of a visible horizon, the mechanical pilot has flown the plane with absolute accuracy.

OPERATION

Psychology Important in Aviation

WRITING on the psychological elements of aviation, David Wechsler, Ph.D., states that air safety depends not only upon the mechanical perfection of the machine and the pilot's knowledge of weather conditions, but also, in growing measure, upon the ability of the flyer. It is not because of chance that Colonel Lindbergh has flown so many thousands of miles without accident. There are certain faculties and qualities which a successful pilot must possess; and he must possess them to a finer degree than would be necessary for any other occupation.

Of course, the physical requirements are obvious. The pilot must have sharper vision, stronger heart, and better muscle control than the average man; he must be able to stand sudden changes in atmospheric pressure, recover quickly from loss of balance, and respond instantaneously to momentary stimuli.

The mental traits necessary are equally important. Correct reaction and quick reaction time are of supreme value. One of the ways in which psychology can assist in increasing aerial safety is in eliminating individuals who are likely to lose their heads in tight situations. Tests devised for psychometric reactions—for measuring the "reaction speed" of an individual—have already proven valuable. A second type of test measures a man's ability to recover his sense of equilibrium; and a third determines his emotional stability, and shows how a pilot will react under sudden stress or danger.

British Pilots Seek World's Distance Record

THE British Air Ministry has approved a plan to recapture the world's distance aerial record for British aviation. A 6,000-mile non-stop flight from England to South Africa is projected. The machine used will be the giant Fairey-Napier monoplane which has been undergoing tests for more than a year for this very purpose.

Carrying fuel for a 60-hour flight, the plane, which has a cruising speed of 100 miles an hour, is expected to set a new record. If it flies from England to the southernmost tip of Africa without stopping, it will exceed by more than 1,000 miles the official record of 4,875 miles made by Captain Costes in his flight across Russia to the Orient.

Radio Telephone to Feature Air Service

ALL planes in the marine division of the Curtiss-Wright flying service are to be equipped with radio telephone equipment; this will be both a safeguard and a convenience for passengers and flying personnel. The decision is the result of successful tests carried out between two planes flying from New York to Miami. Planes so equipped will be able to get weather information or orders affecting their movement from the ground, without the necessity of landing.

A Sikorsky and a Loening amphibian, the former carrying telegraph and voice facilities, while the latter was equipped only with telegraph apparatus, were used in the test. The Sikorsky kept about ten minutes ahead of the Loening, maintaining constant touch with the other ship to inform it in code of weather conditions, and with shore stations to gather by telephone any information that might be helpful on the flight.

Forty New Radio Beacons Ordered for Air Lines

THAT radio beacons will come into general use in aviation is made evident by the fact that forty additional radio range-beacon transmitters have been ordered for installation on the nation's highways. The government's radio range beacon, of the aural type, has been in operation on the Cleveland-New York airway for more than a year, and it has been instrumental in reducing delays and interruptions in the air mail schedule by more than 30 per cent. Safety also, is increased by the radio beacons; air pilots are now unwilling to take off in doubtful weather without properly-serviced radio receivers in their planes. Every one-man airplane on the New York-Chicago route has been equipped with a radio receiving set.

The radio range-beacon is operated in conjunction with radio telephone stations. Its automatic transmission is stopped every fifteen minutes, and it is identified by a station announcement, followed by correct time and weather reports. Then, on completion of the broadcasts, the operation of the beacon is resumed. A simple receiver on the airplane is sufficient equipment to take advantage of the radio service. The receiver is tuned by remote-control apparatus, and can be used by one-man planes as well as by the largest passenger-carrying aircraft.

Finds New Explosive for Rocket Planes

A NEW explosive, recently invented for propelling rocket airplanes, is expected to prove a great advance over the powder used in rockets by Opel and others. The new explosive combines the use of an oxygen bearer, hitherto unused, which was found in a by-product of the chemical industry, with a carbon bearer in the combustion chamber. At the moment of contact the two substances, in the form of liquids, are raised to combustion temperature.

The new explosive develops a force four times greater than its equivalent weight of gasoline. It permits a forty-minute flight for one rocket, as compared with the forty-second flight using the powder rocket. Separate tanks are employed for the oxygen and carbon, and their mixture may be regulated by the pilot in the same manner as the mixture for a gasoline motor.

"Aviation News of the Month"

portrays in plain, yet concise language every important aviation advance during the month. Nowhere can the average reader get such a wealth of accurate and vital information condensed into such a small volume. Some 40 aviation magazines and newspapers are utilized by our editors in the compilation of this department. The publishers welcome short contributions to these pages from the various scientific institutions, laboratories, makers and distributors of planes, etc.

Army Improves Anti-Aircraft Guns

MAJOR GENERAL ANDREW HERO, JR., chief of coast artillery, has declared that anti-aircraft guns and their fire control have reached a stage where effective fire may be directed against loaded bombers. The *New York Times*, giving an account of General Hero's report to Secretary Good, states also that the development of anti-aircraft machine guns will permit an effective attack against any type of airplane coming within range.

"Through the close co-operation of the Ordnance Department, Corps of Engineers, Signal Corps, and Air Corps," says the report, "marked progress has been made in developing, testing, and standardizing new anti-aircraft material. The efficiency of the new material greatly exceeds that of the material now issued to our regular army anti-aircraft organizations."

Patents Cover Planes of Odd Design

AMONG patents issued recently are several covering aircraft control and devices for improved operation. Several of the inventions may appear unusual. For example, one Californian has obtained a patent covering a dirigible of the type of the *Graf Zeppelin*, but having two sets of wings upon which the motors and propellers are attached. Another has patented an airplane with a superimposed wing surface, extending the full length of the fuselage, and having its own tail section.

A Philadelphian has designed and patented a flying machine with four wing surfaces. It has a hollow wing, with pontoons mounted on it, means being provided to vary the pressure within the wing and pontoons by valve control. An Austrian has patented a flying machine with flapping wings. One man from our Middle West has patented a "pusher airplane" with superimposed airfoils; each having a breast portion terminating in a leading edge, a dipping, trailing edge, and dipping side edges which vanish as they approach the leading edges of the airfoils.

An airplane without the usual type of propellers, but with a disc driving mechanism like the old steamboat sidewheelers, is another creation, while still another is a rigid biplane-wing structure in which the wings have a positive stagger at their inboard ends and superimposed tips in plan.

Radio Beams to Guide Sea Flyers

RADIO beams from four powerful stations—two on the European coast and two on the American—may guide transatlantic flying craft of the future, according to Sherman B. Allnck, writing in the *New York Sun*. The beams are the result of a new development in radio-beam transmission. A French engineer, M. Loth, has worked out a system by which they may aid in transoceanic aerial navigation.

The plans call for the erection of two huge transmitting towers, one in Florida and the other in Labrador, or on the coast of Newfoundland. Two more are to be situated in Europe, one in Northern England, and the other in Spain, at Cape Finisterre. The beacons on the American and European coasts will rotate, opposite each other, sending out pencil-like radio waves, which will blaze an "aerial highway" over which the planes will travel. Planes moving across the Atlantic will receive dots from the northern stations and dashes from the southern. When these signals coincide, the pilot will know he is on the right course. When the dashes come in before the dots he will know he has drifted to the south of the course; if he drifts to the north, the dots will come in before the dashes.

In addition to supplying guidance by the dot-and-dash system, one of the beacons will inform the pilot of the distance he has traveled and another will provide meteorological data, to enable the plane to escape storms.

Large Savings Seen in Diesel Air Motor

CAPTAIN L. M. WOOLSON, designer of the Packard engine, has declared that, if Colonel Lindbergh had used a modern Diesel aviation engine on his flight to Paris, he would have been able to carry four men with him. This is because the engine shows a saving of 75 per cent. in fuel cost, 33 per cent. in fuel volume, and 20 per cent. in fuel weight, compared with the modern gasoline aviation engine. The Diesel engine has the added advantage that it does not cause "static" interference with radio communication and direction-finding apparatus.

Invents Safety Parachute

GEORGE G. SCHWABEK a Baltimore inventor, has perfected a parachute which is supposed to open within a few feet after its release, and which can be operated safely from 50 feet to 100 feet above the earth. This is a new minimum altitude for parachute operation.

Instead of the jumper's weight resting entirely on shrouds attached to the outer edge, as with the usual parachute a strand of silken cord supports some of the weight. The cord is attached to the peak of the parachute and thus has a tendency to pull downward from the center, causing the parachute to open almost immediately, similar to the opening of an umbrella.

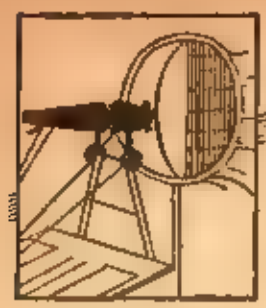
An additional feature of the parachute is a rubber tube attached to the outer edge of the silk. Running from the tube to a small tank filled with compressed air, attached to the supporting straps, is a small rubber hose. If the parachute fails to function properly, the jumper presses a button, which releases the compressed air into the tube and causes the parachute to billow out at once.

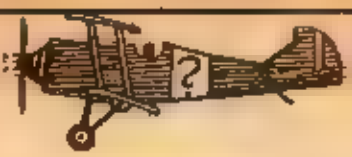
Navy Aviators Require Wide Experience

ENSIGN RODNEY H. JACKSON, U.S.N.R., writing in the *New York Times*, comments on the rigid policy of the Navy Department in selecting and training reserve officers for aviation duties. The requirements now include a year of active duty with one of the regular operating aircraft squadrons attached to the battle fleet on the West Coast or the scouting fleet in the Atlantic. The officer must pass ground-school examinations and a physical flight examination; he must be recommended as potential material by the "crash board," composed of naval officers; he must "survive" an eight months' ground and flying course at Pensacola, and then he must successfully complete his professional examinations. After that he is considered a naval aviator. This final title alone requires a minimum of 200 hours of flying, including at least 70 hours of "solo flight."

The training received is very thorough, and includes familiarity with various types of sea and land planes, with bombers, and with other war craft. His squadron work—in high-class machines—includes the four phases of cross-country flight and navigation, tactical maneuvers from the naval air station or one of the carriers, gunnery, and familiarity with special advanced types of flying.

(*Continued on page 754*)





AVIATION FORUM

THIS department is open to readers who wish to have answered questions on Aviation. As far as space will permit, all questions deemed of general interest to our readers will be answered here. And where possible illustrations will be used to answer the questions. Queries should be brief and not more than three should be put in any letter. Address all communications to the Editor.

The Slotted Wing

Editor Aviation Forum:

I have a question I would like to see answered in your aviation forum in the pages of your interesting magazine, AIR WONDER STORIES.

I intend to build a light airplane upon completion of the plans I am now drawing. I wish to use as many new features in the plane design as possible, and among them the slotted wing. I understand the principle and theory of the slot, but as to its mechanical operation I am at a complete loss. If you can give me a large-scale drawing of this, showing the true mechanism, and all data pertaining thereto, it may be the means of preventing disaster; for everyone knows that flying in Honolulu is no joke, because of the treacherous air currents.

R. W. YORK,
Nuuanu Hotel,
Honolulu, T. H.

(The standard slotted wing to use is the Handley-Page. This device is covered by patents in most countries, including the United States and its territories, and its use is forbidden without permission from or arrangement with the Handley-Page company.

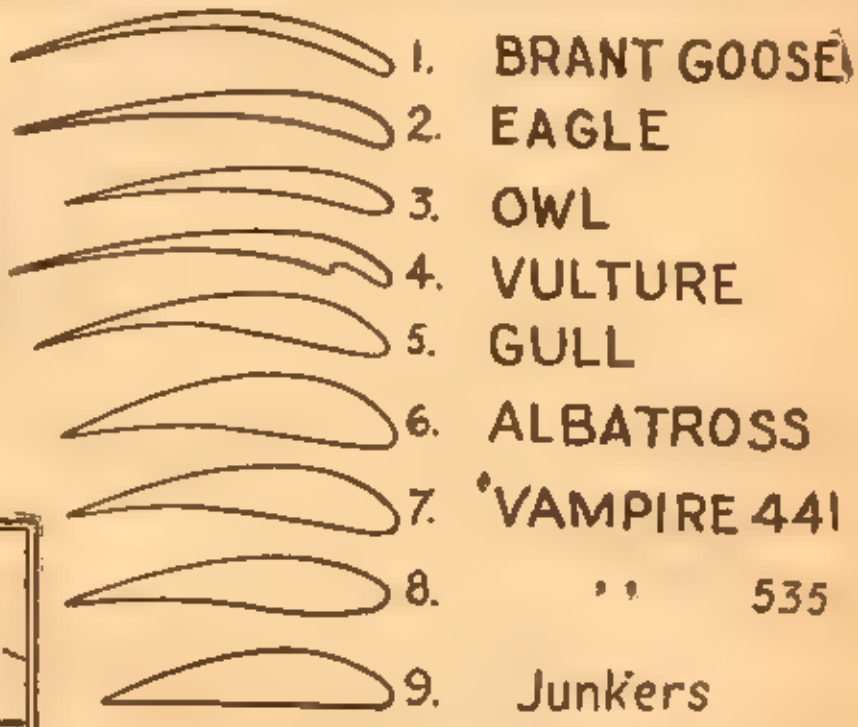
As Mr. York knows, the slot is a mechanical means of overcoming the increase in the angle of attack, that always occurs when a plane loses speed and approaches dangerously close to "stalling" speed. The slotted wing is most useful in taking off and in landing.

The drawings on the left show how the slotted wing operates. The upper drawing shows the non slotted wing at low speed, denoting the increased angle of attack. The air currents pass too far above the surface. The lower drawing shows the slotted wing in action. The air currents are brought close to the surface, giving the plane a "lift."

At such times, the air currents on the upper wing are deflected too far above the wing, and the result is violent eddying, which reduces the "lift" of the plane to a considerable extent, depressing the machine (as above). To overcome this depression, the slot is attached to the leading edge of the wing, running along the span of the wing parallel to, and to about the same length as the aileron. When the speed of the plane is reduced—as before a landing—the air pressure forces the slot away from the wing (above); thus permitting a current of air to pass between the slot and the leading edge of the wing. This new air current will pass very close to the surface of the wing, and give it the same "lift" as would be obtained by a higher speed.

The action of the slot does not depend at all on the pilot. It is entirely automatic, and the aviator can forget about it, secure in the knowledge that it will not fail to operate.

As to Mr. York's particular problems, we suggest that he consult the Handley-Page Company of London, England. The working out of the size and position of the slot, with relation to a wing of a certain size, is a matter of aerodynamic design. It is a highly technical point which requires the attention of expert aviation engineers.—*Editor.*)



The drawing on the right shows the various bird wing shapes used in gliders. In every case the under surface of the wing is curved along the chord (from front to back.) The gull wing shape is No. 5.

About Gliders

Editor, Aviation Forum:

I have read the Popular Book Company's book, "How to Build and Fly Gliders," and I would like to know whether it would be more practical to have these gliders built with curved wings like the sea gulls.

RUDOLPH MUELLER,
238 East 63rd Street,
New York City.

(Many types of gliders have flat lower wing surfaces. But in the chapter on "The Structural Details of German Gliders" in "How to Build and Fly Gliders," page 57, are many curved wing surfaces. The nine types of wings shown here are drawings of the wings of various birds, the name of the bird beside each wing. Wing number five has been taken from the sea gull, thus, like the other eight, is a "curved wing," if by that one means a curvature along the chord, from front to back). That is what we interpret Mr. Mueller to mean. And, as he will perceive, his idea is already in practice. This drawing is reproduced from "How to Build and Fly Gliders"—Popular Book Company, New York.—*Editor.*)

Measuring Miles in the Air

Editor, Aviation Forum:

Is there any instrument on planes to indicate actual mileage flown (not air miles, but ground miles)? If there is one, how is it operated?

If there isn't, would such an instrument be in demand?

WALTER GILLAN,
1918 Rowan Street,
Philadelphia, Pa.

(There is no such instrument for measuring ground miles, for the reason that the ground is irregular, and one may climb hills and descend into valleys, covering many ground miles, and still travel only one mile (air-distance) toward a definite objective. It may be said that it is next to impossible to invent a device which would measure distance as you suggest. Moreover, there is no demand for such a machine. Aviation reckons distance by air miles, and to use another system of measurement would only cause confusion.—*Editor.*)

The Tandem Airplane

Editor, Aviation Forum:

What is the distinguishing characteristic of a tandem airplane?

WILLIAM DUKSTEIN,
2020 McKinley Avenue,
Lakewood, Ohio.

(The "tandem" airplane is distinguished by the arrangement of the wings. Usually the tandem machine is a monoplane, but it may also be a multiplane craft. The wing structures are placed *back* of each other, being spaced along the length of the fuselage.

This design was used in early planes, but is now obsolete. The advantage of the tandem arrangement was believed to lie in the possibility of greater lifting power by greater wing surface. In this way lower speeds could be used and still have the plane maintained in the air. The tandem plane, because of the spreading of the lifting power over such a wide area, suffered from a lack of maneuverability. However, it is no longer used. The original model was taken from the glider, which used tandem wings—one behind the other on the same plane.—*Editor.*)

THE READER AIRS HIS VIEWS

IN this department we shall publish every month your opinions. After all, this is your magazine and it is edited for you. If we fall down on the choice of our stories or if the editorial board slips up occasionally it is up to you to voice your opinion. It makes no difference whether your letter is complimentary, critical, or whether it contains a good old fashioned brickbat.

All of your letters, as much as space will allow, will be published here for the benefit of all. Due to the large influx of mail, no communications to this department are answered individually unless 25c in stamps to cover time and postage is remitted.

The Neighborhood Casts Its Vote

Editor, AIR WONDER STORIES:

All the fellows in our block unanimously voted Air Wonder Stories our favorite magazine and we also held a secret ballot classifying all the contents of the magazine according to a percentage rating. After the votes were counted and percentages calculated, the voting stood as follows:

Paul's Cover Illustration	96%
Serials (3 to 6 months)	8[illegible]%
Reader Airs His Views	8[illegible]%
Longer Stories	7[illegible]%
Paul's other illustrations	75%
Aviation Forum	75%
Air Station News	7[illegible]%
Questionnaire	71%
Editorial	6[illegible]%
Serials (2 months)	6[illegible]%
Shorter Stories	5[illegible]%
The magazine's average	7[illegible]%

Rating: 96% excellent, 75% to 85% very good, 70% 75%, good, 65% 70%, fair, 0% 65% poor.

The boys do not like Paul's human figures; they seem to be drawn carelessly. We all want a bi-monthly and are waiting anxiously for the publication of the first issue.

In answer to Mr. Wallace D. Wardner we say: "Keep the romance in Mr. Vincent's stories. We do not want 'cold-blooded' scientific stories."

ARTHUR BERKOWITZ,
Bronx, New York City.

(This neighborhood vote is very interesting, and we must say we are gratified by the high averages reached. The concerted opinion of a group of alert young people is interesting.

Paul is noted for his imaginative portrayal of future scientific instruments. The "cold blooded" scientific stories we find are not generally liked. In fact we try to make each story as interesting as possible, and a good deal of the interest lies in what is known as the "human appeal." For our interest in science to a certain extent lies in what effect it has on our lives. We would be very glad to hear from other groups and in fact if they will send us their rating and the names of the voters we will be glad to publish them. We cannot thank Mr. Berkowitz's group too much—for their idea is splendid.—*Editor.*)

High Landing Platforms Impractical

Editor, AIR WONDER STORIES:

This rather critical communication can hardly be considered as intended for any one of your science fiction magazines, but rather as a part of comic relief on your "space flying" and "future warfare" stories, wherever they appear. Probably it would best be considered as called forth by the AIR WONDER STORIES.

I notice that a great deal of attention is being paid to landing platforms high above the cities of the world. This, perhaps, is an interesting theme to the layman. However, I believe your desire is to follow the lines of probable development. In my opinion—and, I believe, in the opinion of almost any other pilot who might take time to think it over—such a landing station would be worse than useless. The reason, of course, is the altitude. Planes that are "climbs" and make best at Dallas (altitude 560 feet) become decidedly dangerous at commercial ports in the United States. The thinner atmosphere causes a decrease in lift at a given speed causing the plane to land faster and to get out of control, because of lack of speed, usually falling into a tail spin, and to be less sensitive to its controls in normal flight. With a landing field in the air we should find ourselves to deal with the additional factors in the execution and the transportation of passengers, freight and so forth from the ground to the "field."

In all your "rocket" stories so far (except one where a plane was endangered by losing the oxygen out of the earth's atmosphere) I have never read of an interplanetary vehicle with wings and normal airplane controls. Why? Wings, of course, can be no good in space but, if they have no action what harm can they do and can you think of a safer device for landing? Certainly, where there is no atmosphere, the streamlining of a projectile makes no difference (meaning that the tremendous speed necessary would strip wings off anything once it did *encounter* an atmosphere still it seems to me that they would be very useful in getting a start—and that a course might be made striking the new atmosphere obliquely on its outer edges, and gradually allowing the drag of the wings and ship to pull the speed down to normal. I'm not a scientist—just a pilot—and a pretty green one, at that—but we all get notions now and then. Mathematics are even now trying to tell us that the Greek and Roman goddesses weren't pretty because they were too fat. Well!

To get back, though, please *don't* call this a brickbat. It's not. I don't care for your covers—but, just the same, I've read every magazine of science fiction that you've published in the last two years. That's a lot of time, and a lot of quarters and halves! Do I need to say more about my opinions of your magazines in general? You have your work under screaming covers—but that's not the first time that tinsel has covered pure gold.

LIEUT. DING,
c/o Hangar No. 6,
Love Field, Dallas, Texas.

(These acute comments from a pilot are useful in clearing up questions which have, perhaps, perplexed other readers. As to the unreliability of planes forced to land on high platforms, we can only say that machines will be developed to correspond to changes in the method of operation. Before there are platforms so high in the air, flying machines will be ready for them. One has only to consider the Guggenheim safety contest as an example of this development. Planes have been entered in it designed especially for slow landings and for stability under almost any adverse conditions. With planes that can right themselves after a drop of 500 feet, as the contest stipulates, we feel that high platforms will not be useless. The expense of transporting passengers to the platforms will not be great. High-speed elevators carry passengers and freight to the tops of great buildings. The same system will probably be used for the high landing fields.

As to the question of wings on rocket-ships, interested readers should study Max Valier's article on rocket flying in this issue. He proposes a rocket *equipped with wings* to travel at an altitude of 55 kilometers (about 34 miles), and at a speed which will take it from Berlin to New York in little more than one hour. Of course the wings are used as a brake for landing. But in space flying wings are unnecessary, and the enormous speed of the rocket in leaving the earth would cause the atmosphere of the earth to rip the wings off before the machine passed out from the atmosphere.

We appreciate this letter. That the writer has devoted so much thought to our problems we take as an indication of keen interest. We shall try to make our magazines better and better, so that the quarters and halves will prove a profitable investment.—*Editor.*)

Air Pockets

Editor, AIR WONDER STORIES:

In the October issue of AIR WONDER STORIES appeared the story "Around the World in 24 Hours." In this story a statement is made that air pockets are variations existing in mid-air, and are caused by electrical disturbances very similar to lightning and the static that causes much trouble in radio reception. Will you please verify this report?

MEYER TEST
2610 Victor Street,
Kansas City, Mo.

(The term "air pocket" is used to designate a phenomenon similar to the one you describe. In reality there is no such thing as a "pocket." In the current volume "Aviation from the Ground Up" (Frederick L. Drake, Lieutenant Marine) has this to say about air pockets:

"The reflection of the sun's heat from light colored ground promotes more or less local air movements over a not very large area and accounts for the 'bumps' and air pockets you often hear mentioned in connection with aerial flight. The bumps are caused by the formation of warm ascending air striking the aircraft thus causing it to be carried up with the air current. The so-called pockets, of which there are none, are caused by the descending cooler air striking the aircraft, causing it to be carried down with the air current. Thus, while "air pockets" are not in reality vacuum spaces, they act as though they were causing the plane to slip downward abruptly. The reference to electrical disturbances is that these phenomena are often accompanied by clouds of vapor (electrically charged) which in the forerunner during the summer, of electrical storms.—*Editor.*)

Impatient for Science Club

Editor, AIR WONDER STORIES:

To say that I want to compliment you on your magazine AIR WONDER STORIES would be putting it mildly, but you know how it is when words simply "fail ya."

Your December issue was the best number in the history of the magazine. Every story was perfect. I place them as follows:

1, "Cities in the Air," 2, "Flamecloak," 3, "Invention," 4, "Her Line Demon," 5, "The Flight of the Eastern Star," 6, "The Phantom of Callon," 6, "Freedom of the Skies."

I see you are starting a SCIENCE FICTION CLASSIC series. That's great! I always wanted to have a Science Library, and I'm glad to see you are ready to help us by selling us these Classics.

You can be sure I'll back you up on that, for now that I am proud to say I have already started. I have all the numbers of both magazines AIR WONDER and SCIENCE WONDER.

Who said short serials? You know we like 'em long. "The longer the better" is my motto. I even think that the "Ark" would have been better (if that's possible) if it had been longer. How about a sequel to that story? For example, he could tell how the different nations used the inventions the hero or leader gave to the world.

I am a booster of Mr. Chappelow's idea of starting a scientific club. How about calling it a SCIENCE WONDER CLUB? We could have pins for the members—a pin just like your emblem in the front of the magazine. Wouldn't that be a good idea?

Let's get organized. Let's do something. I don't know anything about science but I'd like to learn and I suppose I will when the club comes into being. Hail to the new SCIENCE WONDER CLUB!

HUBERT J. LEMERISE,
850 West 50th Place, Chicago, Ill.

(A great many readers have signified their appreciation of our Science Fiction Classics, and all indications point to an unusual popularity for these books. There is no better way to start a science fiction library.

The serial controversy still rages. We invite more comments as to the length of our continued stories. As to the Club, so many readers have begged for it, that we are giving it very serious consideration.—*Editor.*)

If Not Air Stories What Are They?

Editor, AIR WONDER STORIES:

Six months ago I received your offer to subscribe for AIR WONDER STORIES. Taking advantage of this offer I sent in my subscription for two years. When I received my first issue I quickly looked it over and I was greatly disappointed because I expected to see some good interplanetary stories. Six months have passed and yet no sign of any. I am still hoping some will appear. *If interplanetary stories are not air stories, what are they?*

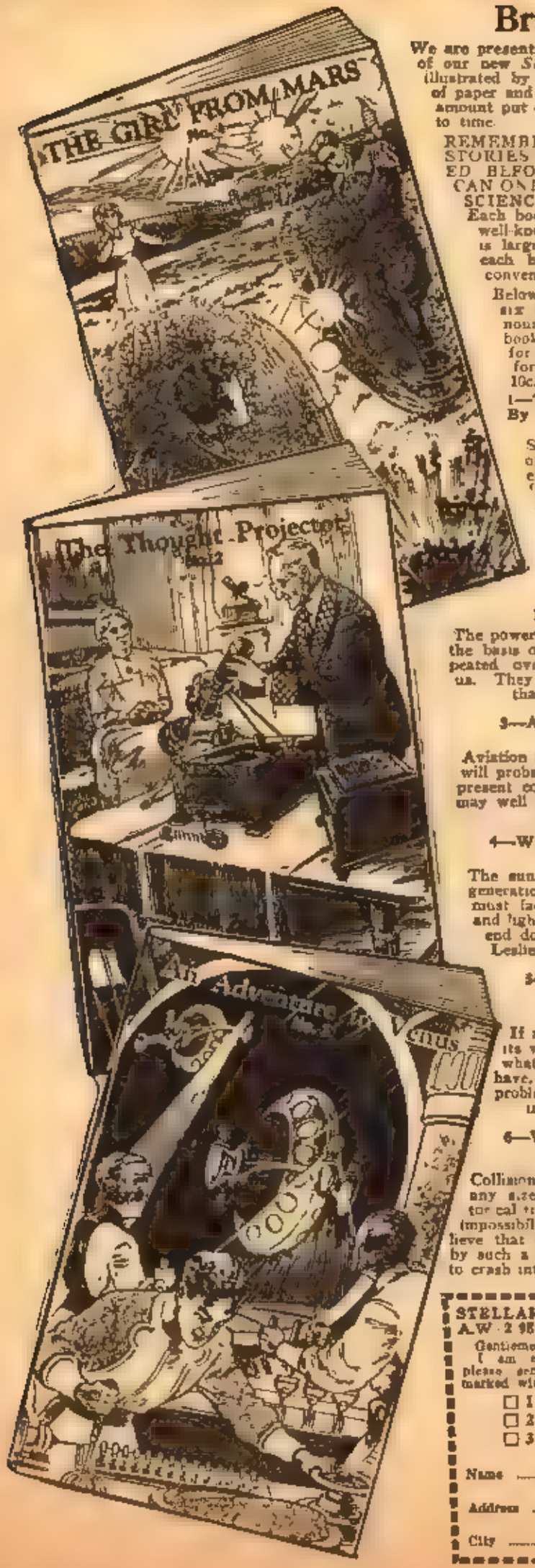
The readers usually write that Paul's drawings are too bad, and yet they probably first took notice of the magazine through the lood drawings. Keep up the good work, Paul.

GUSTAVE BUSSE,
339 Wilson Avenue, Brooklyn, N. Y.

(We are sorry Mr. Busse was disappointed in his expectations. However if he will turn over the table of contents for the present (January) issue he will find "The Death Ray" by Metron, the first interplanetary story in accordance with our new policy. This should compensate him adequately in the future we can promise him more interplanetary fiction.—*Editor.*)

(*Continued on page 762*)

NEW SCIENCE FICTION SERIES



Brand New Series

We are presenting to our readers the first twelve numbers of our new *Science Fiction Stories*. These small books, illustrated by artist Paul, are printed on a good grade of paper and are sold at a low price, due to the large amount put out. New ones will be issued from time to time.

REMEMBER THESE ARE BRAND NEW STORIES AND HAVE NOT BEEN PUBLISHED BEFORE IN ANY MAGAZINE. THEY CAN ONLY BE SECURED THROUGH THE SCIENCE FICTION SERIES.

Each book contains one or two stories by a well-known science fiction author. The type is large and well-readable, and the size of each book is 6x8 in., which makes it convenient to carry in your pocket.

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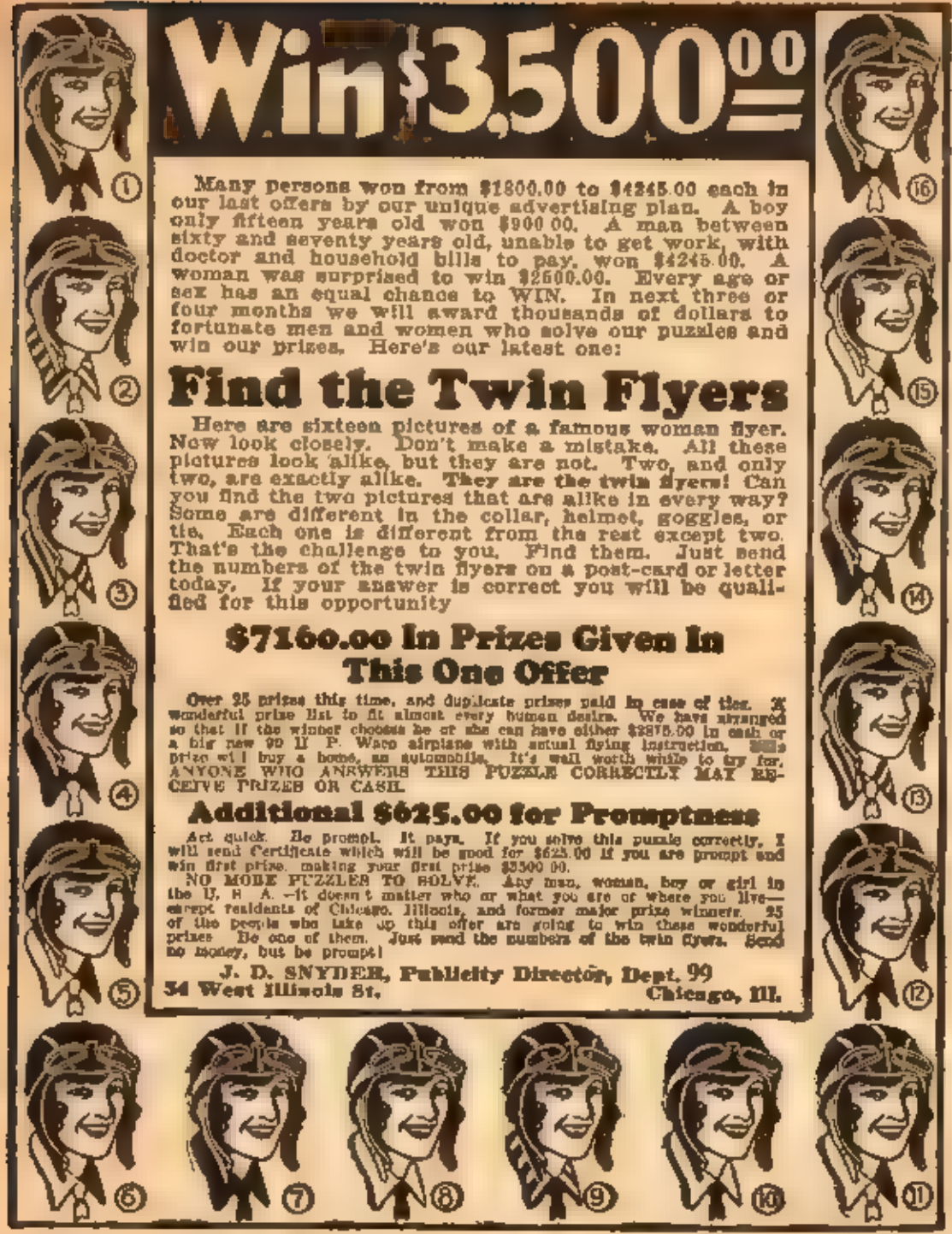

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AVIATION NEWS
OPERATION

(*Continued from page 750*)

Dr. Dornier to Start Transatlantic Line

DR. CLAUDE DORNIER, head of the Dornier Metallbauten of Friedrichshafen, Germany, and designer and builder of the largest airplane in the world, the *DO-X*, has arrived in the United States for the purpose of starting the Dornier Corporation of America. This organization has been formed by the General Motors Corporation in conjunction with the Fokker Aircraft Corporation, and Dr. Dornier

"Within a year, I do not see why we should not have our factory completed and three or four planes in the air," said the inventor. He expects to bring from Germany several factory foremen, draftsmen, expert metal workers, and other "key" men, as well as a great number of the special tools used in Germany for the construction of his planes.

Dr. Dornier has projected the most ambitious of all transatlantic airplane flights. He intends to carry twenty people across the ocean from Europe to South America, and then up the coast to New York. The matter of synchronization and vibration, with a great many engines running at the same time in the same plane, has been successfully worked out; and the larger planes, according to Dr. Dornier, have less noise in the passenger cabins than the smaller ones.

"Mystery Plane" Built for Lindbergh

COLONEL LINDBERGH has seen the completion of a new plane built for his private use. Its details, unlike those of ordinary airplanes, have not as yet been fully explained. Like his famous transoceanic craft, it is a monoplane, but one with a very low wing, and with a very high degree of maneuverability. Built at the Lockheed factory, the plane, which is unusually large, is fully streamlined, and is powered with a new Wasp motor of 450 h.p. It has a top speed of 190 miles an hour.

To reduce head resistance, the engine is housed in by the N.A.C.A. cowling, a device perfected by the National Advisory Committee for Aeronautics. The new plane has an open cockpit seating two persons. The resistance of the landing gear is cut down by the use of metal housings (known on the flying fields as "pants"), covering the wheels almost to the point of contact with the ground.

Filtered Whistle May Tell Airplane's Height

DIFFICULTIES in the construction of apparatus for telling the height above the ground of a moving airplane were described by Lieut. Leo F. Delsasso, U. S. Naval Reserve, physicist in the University of California at Los Angeles.

The maintenance of regular schedules by commercial fleets now requires flying in all kinds of weather; and even though the ground is out of sight, the pilot must know his clearance. The barometer, time-honored altitude gauge, falls short of giving satisfaction on at least two counts. In the first place, it measures altitude from sea level, not from the ground, and thus gives scant information in mountainous country. Furthermore, natural air-pressure conditions may change during a single flight so much that the barometer dial setting is thrown off as much as 500 feet or, in exceptional cases, 1,000 feet or more

The sound-resonance method of altitude detection, developed in the Navy some years ago by Lieut. Delsasso and others, is regarded as the best prospect. When used in ordinary navigation, the depth of the sea bottom is readily measured from a vessel. If a loud, sharp sound be emitted downward from a flying airship, its return echo may easily be received and timed with proper chronometric apparatus. From the known speed of sound in air one may calculate the distance to earth. This scheme works fairly well with a lengthy craft such as the *Graf Zeppelin*, where the delicate sound receiver can be mounted far from the noise of motors. With the airplane, however, the noise of operation is so great that the pilot finds it almost impossible to analyze the echo returning from the earth. He is unable to tell which returning sound is the tell-tale signal.

Research in progress in Lieut. Delsasso's laboratory indicates that a sound filter will solve the difficulty. A very sharp sound—preferably one generated by a whistle—is chosen to give one simple frequency of vibration, but in great amplitude or intensity. Such a selected sound is sent downward from the plane, and its echo received in apparatus adjusted to catch the least possible direct sounds from the nearby motors. In the receiving apparatus, the desired sound is built up by a suitable resonator which does not respond to the miscellaneous motor noises. The extraneous sounds may then be damped considerably without loss of the specific sound which is desired.

(*Continued on page 755*)

AVIATION NEWS
OPERATION
(Continued from page 754)

Orlebar Describes High-Speed Flying

AUGUSTUS H. ORLEBAR, holder of the world's air-speed record, has described the sensations of flying at 350 miles an hour. The airman is quoted as saying that the sense of speed is lost, but that the body is affected to a remarkable degree. The flyer experiences the phenomenon of "blacking out," or temporary loss of sight. This has been ascribed either to the centrifugal force of a turn, acting vertically down on the body and drawing the blood from the artery behind the eye, or else to the blood's being drawn from the whole brain, the sense of sight being lost last of all.

Orlebar, through a practical test, decided that a drained artery was the cause of the loss of sight. He found his brain functioned, even while his vision was impaired.

Standardization of Parts Will Reduce Plane Costs

THE Society of Automotive Engineers, which has been primarily responsible for the progress of standardization in the motor vehicle field, is now turning its attention to the airplane industry, with the purpose of bringing about standardization of parts and eliminating expensive duplication and complication of manufacturing effort. In this way, it is hoped the aviation industry will be assisted to repeat, in a measure, the great commercial success of the automotive industry.

As an example, it is pointed out that the present S. A. E. specifications on shaft-ends and hubs for aircraft engines provide a series of four splined shafts and two sizes of the tapered type, whereas there are now in existence approximately 30 different tapered shaft ends smaller than the S. A. E. No. 1. These shaft ends are substantially the same, except for slight variations in the taper and the size of the shaft, and it is suggested that the aircraft-engine division of the standards committee give consideration to the adoption of a standard tapered shaft end.

Balloon Curbs Fog Danger at Airports

CAPTAIN BURDETT PALMER, Army reserve officer, has invented a captive balloon which has mechanical gauges for measuring the depth of fog banks. The invention will reduce considerably the dangers of fog above an airport.

Directly beneath the balloon is a dial, visible for several hundred feet, which gives the pilot the information necessary for a safe landing. The use of a lighting system, with a revolving beacon, will allow pilots to locate and identify airports, by day and by night.

Airplane Launched from Automobile

A STANDARD MOTH plane, weighing 1,300 pounds, has been successfully launched from an automobile in motion. The test took place at Old Orchard Beach, Maine. The plane was sent into the air from a catapult on the roof of a car traveling at a speed of 52 miles an hour, a rate which approximates the take-off speed of airplanes.

Prefer Steel Tubing Airplane Fuselage

AIRPLANE pilots are unanimous in their preference for metal fuselage over the "stick-and-wire" type, according to J. H. Kindelberger writing in the November *S. A. E. Journal*. This preference is due to the fact that wood will not withstand the extreme shock and impact loads, incidental to a crash, without splintering and splitting.

"In my experience as a pilot during the war, I saw many crashes in which the injury to personnel was due solely to splintering of the wooden structure. On the other hand, the metal structure, particularly the steel-tube type, will withstand the most severe crash with only bending or buckling of the members. Many of the most experienced pilots will refuse to fly in an airplane whose fuselage is not of all-metal construction."

(Continued on page 757)

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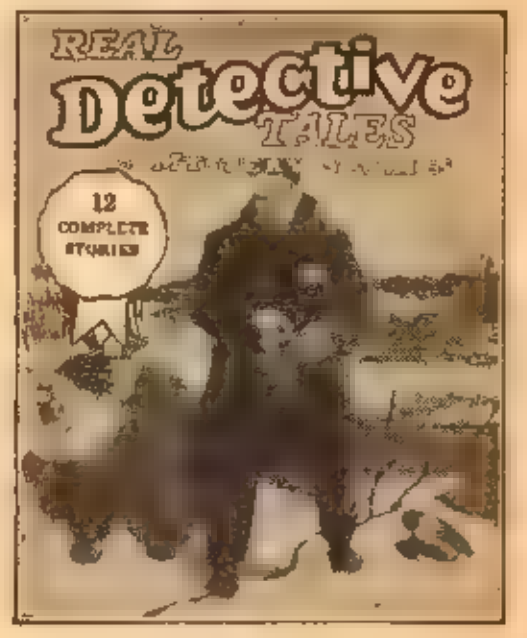

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AVIATION NEWS GENERAL

(Continued from page 755)

Costes Sets Flying Record

CAPTAIN DIEUDONNE COSTES, the French airman who set a record by flying to Manchuria from Paris, has beaten his own record and set a new one for the return flight, it is reported. The aviator and his associate, Maurice Bellonte, completed the trip from Indo-China in four and a half days and, but for a storm over the Mediterranean, they would have cut at least 24 hours from the new flying time. As it was, they bettered the old record by seven hours.

The flights of Costes, two of the longest ever made, averaging almost five thousand miles each, have opened a new field for flight-record contenders. The present flight is the first made by an airplane from Paris to the farthest corners of Asia.

"Macaviator" New Name for Gyroscope

THE office of the Chief of the Army Air Corps has now coined the term "Macaviator" to designate the Sperry gyroscope control used in airplanes. The automatic pilot, which keeps the plane on an even keel, is now known by a name derived from the words "mechanical aviator"—a word which will take its place with "metal mike," the gyroscopic wheel-control of steamers, and "avigation," which describes the science of aerial navigation.

Lufthansa Delays Ocean Air Service

ALTHOUGH it is impossible, at present, for the Lufthansa organization—the greatest flying company in Europe—to begin a regular air service between Europe and South America, the company will fly airplanes as far as the Cape Verde Islands, by way of Seville, Spain. The loads will consist of mail and expensive freight.

From the Cape Verde Islands, goods will be carried to Fernando Noronha by ship, and thence again by airplane to Pernambuco and to Buenos Aires. The longest leg of the journey—the 1,500 miles between Cape Verde and Fernando Noronha—cannot be covered economically by airplanes, because the radius of the machines is, at present, not sufficiently great. However, the great *DO-X* could make the trip; but even then it would have to undergo alterations.

R-101 Rides Out 83-Mile Gale

THE giant British dirigible, *R 101*, established a record when it rode out a gale of eighty-three miles an hour. No dirigible has ever before been subjected to such high wind velocity, it is said. Riding at its mooring tower at Cardington, England, the airship exerted a pull of twelve tons on its nose wire, and it is the first craft of its kind to have withstood successfully such straining at the masthead. The same wind which tested the *R 101* was strong enough to blow a troop train off the tracks.

Ice Formation on Planes Still a Great Menace

ACCORDING to C. B. Allen, Aviation Editor of the *New York World*, the menace of ice formation on plane wings has not been solved, and the Guggenheim contest has made no provision for it. When an airman is forced to land because his plane is "loaded up with ice" it means, not that he was brought down by the weight, but that the chief cause of his forced landing was the change of camber or contour that occurs in the wings when they begin to take on ice. The weight itself is only a minor factor, and does not bother airmen at all. It is the camber that determines the efficiency and lift of the wings and the main menace of ice is that the wing contour is invariably changed, and the lift correspondingly destroyed.

If the ice formed in layers of the same thickness over the entire ship, it would be possible to take on hundreds of pounds and still maintain flight. However, the plane "sinks" through the air because the one thing that supports it has been distorted and destroyed. Reserve motor power is almost useless; because the loss in efficiency on the ice-clogged wings is so great that it is only a question of minutes at best before the machine is forced down.

Although the menace of ice formation appears simple compared with the other problems of aviation that have been solved, the fact remains that all attempts at solution remain futile. The discovery of a method for melting the ice on plane wings will remove one of the most serious menaces to flying.

(Continued on page 758)

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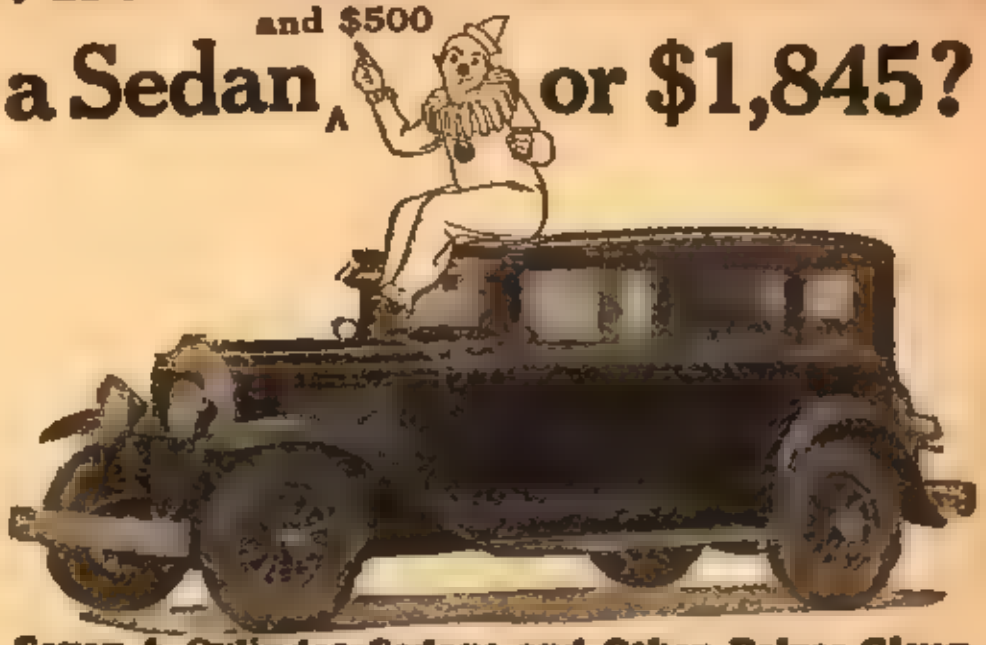

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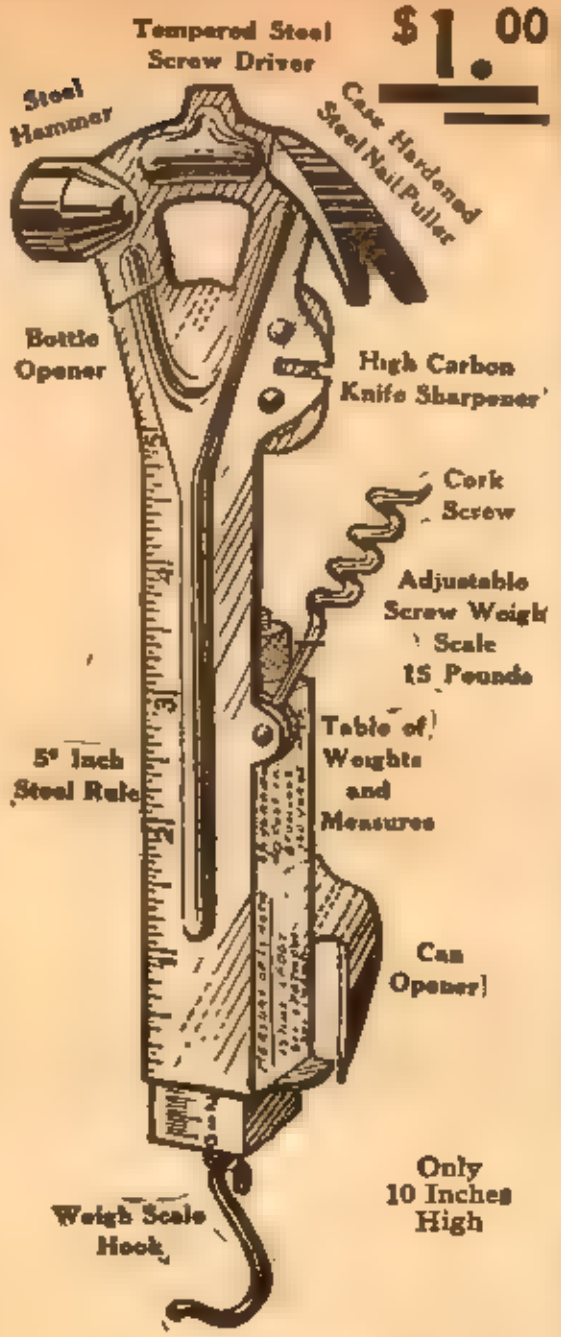

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AVIATION NEWS GENERAL

(Continued from page 757)

Divide Control of Aeronautics

CLARENCE M. YOUNG, Assistant Secretary of Commerce, announced recently a reorganization of the aeronautics branch of the Department of Commerce. The duties formerly performed by the Director of Aeronautics have been divided between two newly appointed officials.

The aeronautics branch has been classified into two main groups, the first being the licensing and inspection service, and the second the aeronautical development service. The licensing and inspection service is charged with approval and licensing of aircraft; licensing of pilots; approval of flying schools, and other activities involved in the operation of aircraft. The work of the aeronautical development service includes assisting communities to select and develop airports; rating of airports, promotion and correlation of aeronautic research, publication and dissemination of aeronautic information; publication of aerial navigation maps and the general promotion activities of the department for the development of civil aeronautics.

Buffalo Women Take Up Gliding

THE Women's Glider Club, the first organization of its kind, has been formed in Buffalo for the purpose of promoting and encouraging glider flying in that city and elsewhere. Many future feminine aviators are becoming accustomed to altitudes by means of these motorless craft, in the hope that some day they will be able to drive their machines through the air.

Major John Goetz, founder of the club, and also its instructor, believes that gliding is the safest and most practical way for the embryo aviator to get the "feel" of the air. The major hopes to qualify his pupils, in eight lessons, for their first instruction in airplane flying.

Insists on Necessity for Huge Aircraft

HARRIS M. HANSHUE, president of the Western Air Express and of the Fokker Aircraft Corporation, says, in an interview with Earl Reeves in the *New York American*, that the giant plane is an absolute necessity for the development of aviation. As a matter of fact, the air giants rate highest in importance because in load capacity, higher speed, and longer range, they shine. For this reason the giant plane will bring aviation within reach of and in touch with millions. The success of the *DO-X* has pointed to the not-far-distant time when 150-passenger planes will enter into direct competition with railroads and steamship lines.

The newest Fokker express planes can compete with the railroads in that they carry thirty-two passengers, operate at 130 miles an hour, and cost only $1 a mile to run. The $1 includes all overhead and the costs of selling transportation. When the planes span the continent regularly in 24 hours—as they soon will—then aircraft transportation will be almost on a stable basis comparable to the railroads.

Shortage of Aircraft Hampers Army

FRANCIS D. WALTON, writing in the *New York World* speaks of a shortage of planes which is seriously hampering the workings of the Army Air Corps. This shortage has been made public by F. Trubee Davison, Assistant Secretary of War in charge of aeronautics.

"The Air Corps," says the report, "finds itself in the position of being charged with the air defense of the country and its possessions from land bases, including aerial seacoast defense, appreciating the strategical and tactical value of airships, realizing the possibilities of future development, but unable to do anything on account of lack of appropriations."

Conditions are very serious, says the report. This is illustrated by the fact that at Mitchel Field, and elsewhere throughout the Air Corps, there are three pilots to-day to every airplane. The regular army's air material for the defense of New York, during 1929 and up to a short time ago, consisted of fourteen two-place observation planes, six of which are in bad condition. The regular army's air force in New York, at the present time, consists of eight service type planes—and there are seventy officers for these eight planes. In them they must maintain their flying status in order to draw their pay.

Conditions elsewhere are equally serious; chiefly because of the lack of planes in the various fields. The condition is said to be one which should be remedied if the nation is to keep pace with the great plans for its development of the aircraft service.

(Continued on page 759)

AVIATION NEWS GENERAL

(Continued from page 758)

Popular Subscription Aids Russian Flying

THE largest society of its kind in the world, according to William L. Laurence, in the *New York World*, is the Osoaviakhim, a popular flying club formed in Russia. Ever since the successful flight of the *Land of the Soviets*—the Russian plane which flew 12,500 miles—the popular imagination has been excited to a very high degree. With characteristic Russian fervor, the people have banded together to promote aviation, and the result is probably the largest club in the world, with a membership of over 3,500,000, derived from about 50,000 affiliated branches in all parts of the country. In the four years of its existence—the club was in existence before the epoch-making flight, but it never became prominent until after the flight—the organization has done much to make the people of the Soviet Republics air-minded.

Claims Extraction of Plane Fuel from Air

PROFESSOR RYNIN, a Russian engineer, claims to have developed a method whereby airplane fuel can be extracted from the air. By means of this method, he says, planes will be able to fly for months, relieved of the necessity for refueling. This will be accomplished by flying at a height of 15 miles, where the lack of atmospheric pressure will make possible a speed of 1,000 miles an hour.

Nation Has 1,509 Airports

ACCORDING to Clarence M. Young, assistant secretary of Commerce for Aeronautics, there are 1,509 airports in operation in the United States. Of these, 140 are municipal, 465 commercial, 273 intermediate, 86 government, and 240 auxiliary fields. Among the states, California leads with 161 airports.

Approximately 1,778 more airports are either proposed or in process of construction. More than four thousand other fields in the United States, on which aircraft landings may be made, are owned by states, municipalities, corporations, clubs, commissions and individuals. Many temporary fields are on farms. These however are constantly changing in character with the alternation of crops, and for other reasons thus making a permanent record of them impossible.

Lack of Funds Cripples Air Corps

IN his annual report to the Secretary of War, Major General James E. Fechet declared that lack of adequate funds is hampering the training of the Army Air Corps' personnel. The same lack of money has held up much of the building construction work contemplated in the five-year program laid down by Congress in 1926.

General Fechet has stressed the need for strengthening the Air Corps Reserve, especially the first group of pilots who would be subject to immediate call to duty in time of war. Furthermore there is no provision for planes of the military type, for training this arm of the service. The lack of funds has resulted in the poor condition of hangars and other necessary equipment. "This condition has become so acute as to be classed as dangerous at some stations, such as Kelly Field, Texas."

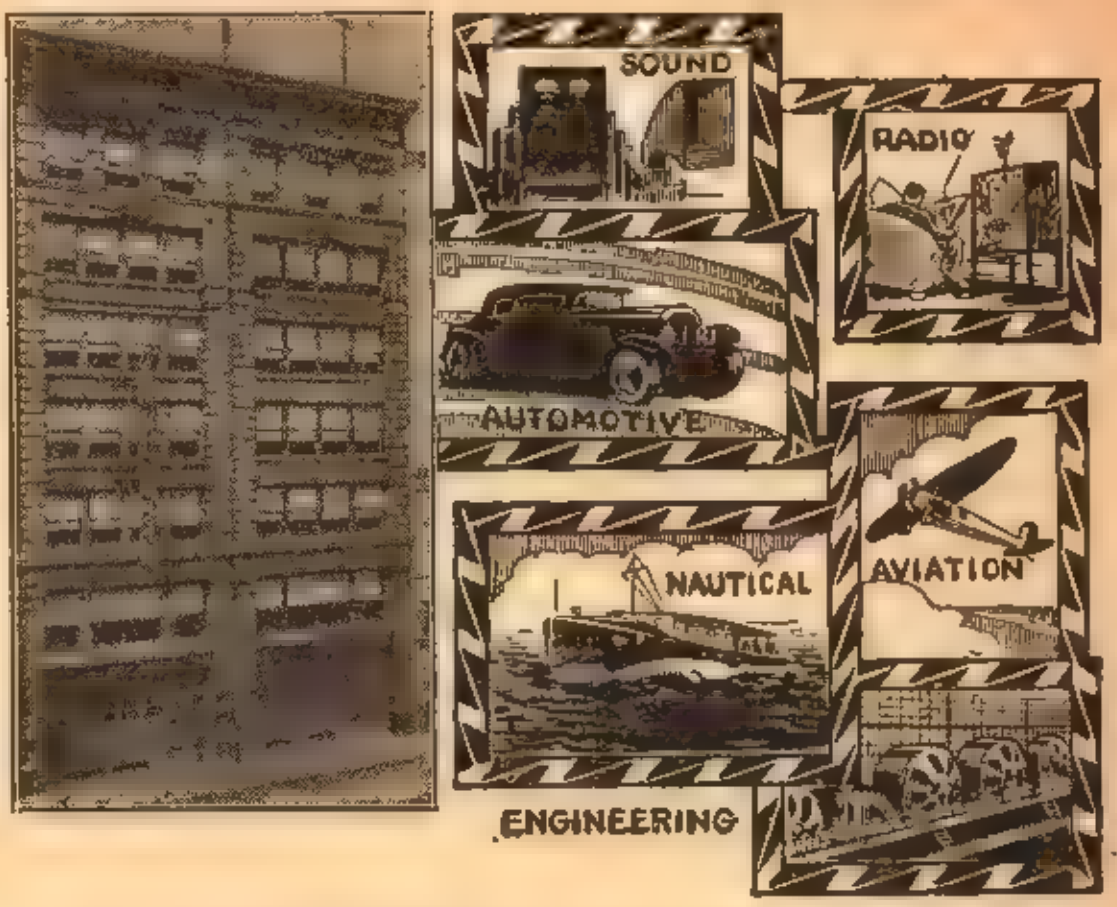
New York "Air Rights" Bring Rentals

THE "air rights" of New York City have a value of several thousands of dollars annually as further recognition of the link between business and aviation, between aviation and the life of the nation. The high price thus far for open space above a building was reached when the owner of a five-story building at 31 Broadway, in lower New York, leased the "air rights" above his roof to a real estate firm for $742,500, payable over a term of thirty-three years. This means that for thirty-three years no other building will be reared on the site leased. Otherwise, it is conceivable that this valuable downtown space, in the heart of the financial district, might have been used for an office skyscraper.

The increase in real estate and in the value of "air space" is enhanced by the close relation of modern aviation to every-day life. The leasing of "air rights" is the first step toward the prophecied high "landing platforms."

(Continued on page 761)

"ELECTRICAL OPPORTUNITIES"



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SEE PAGE 748
2 2 30

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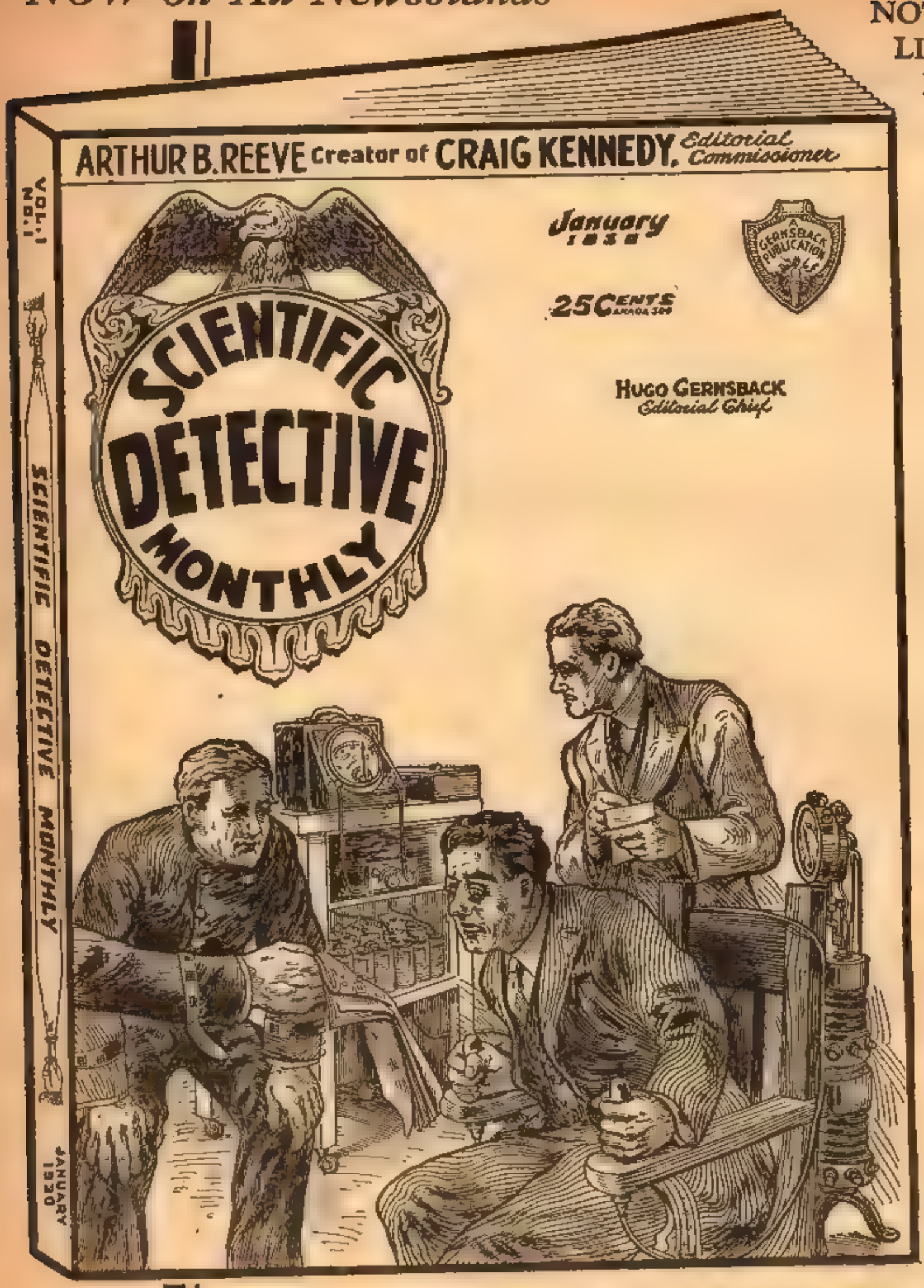

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AVIATION NEWS GENERAL

(Continued from page 759)

Rescued Lindbergh at Le Bourget

ACCORDING to P. J. Philip, in *The New York Times*, Commandant Pierre Weiss, of the Thirty-fourth (Le Bourget) Aviation Division, claims that he and two other French airmen hid Colonel Lindbergh from the crowd on the evening when the Colonel landed at Paris after his famous flight across the Atlantic in 1927.

In a little book entitled "Space"—written recently by the Commandant—this incident and many others concerning Colonel Lindbergh are related. It would seem that the contemporary newspaper accounts of the Colonel's landing were a trifle exaggerated, in view of the information presented by Commander Weiss.

Amelia Earhart Sets Women's Speed Record

MISS AMELIA EARHART, whose transatlantic flight brought her into prominence, has established a new women's aviation speed record, making an average of 184.17 miles per hour over a mile course in four laps.

The fastest lap of the four was flown at a speed of 197 miles an hour. The previous women's speed record was 156 miles an hour, made by Mrs. Louise Thaden, of Pittsburgh.

Air Pilots Earn Over $5,000 a Year

ACCORDING to William L. Laurence, writing in the *New York World*, the average air pilot earns $5,556 a year—and works about two and a half hours a day for it. Of course, there are young pilots who earn only $35.00 a week; but the larger air transport companies pay well. In addition, some of the flyers receive additional compensation, at the rate of 5.5 cents a day mile and 9.3 cents a night mile.

When one considers the cost of learning to fly, and the cost of flying machines—if the pilot has his own plane, as frequently happens—the salaries, which may appear large, are seen in their true perspective.

Plane Held in One Spot by Gale

ARMY fliers at Rockwell Field, San Diego, California, testify to the phenomenon of an airplane flying at a speed of 130 miles an hour, which was held in the same place for thirty minutes by a gale blowing at 130 miles an hour. The strange occurrence took place at a very high altitude—25,000 feet. It was owing to a terrific wind velocity that the aviators, who thought themselves traveling, were in reality standing still and just compensating the wind pressure against them.

Britain Orders Plane of *DO-X* Size

GREAT BRITAIN has now ordered a flying ship of practically the same dimensions as the Dornier *DO-X*, which has already created several airplane records. The new plane is designed for civil aviation purposes, and, like its famous predecessor, will have three wings and twelve motors. The difference in construction will lie in the mounting of the motors between the lower and middle wings, whereas the *DO X* has its engines on the upper wing. The new motor position is expected to give greater speed than the German craft possesses.

United States Makes Aircraft Accord with Canada

THE United States has made a reciprocal arrangement with Canada governing the admission of civil aircraft, the issuance of pilots licenses, and the acceptance of certificates of airworthiness for aircraft imported as merchandise.

While the regulations themselves are too long and too involved to be enumerated here, the fact remains that aviation is proving a vital factor in bringing together the two greatest nations of North America. It is felt that this latest demonstration of international amity, the result of an increase in flying, will have as much to do with mutual understanding as the diplomatic visits of foreign officials.

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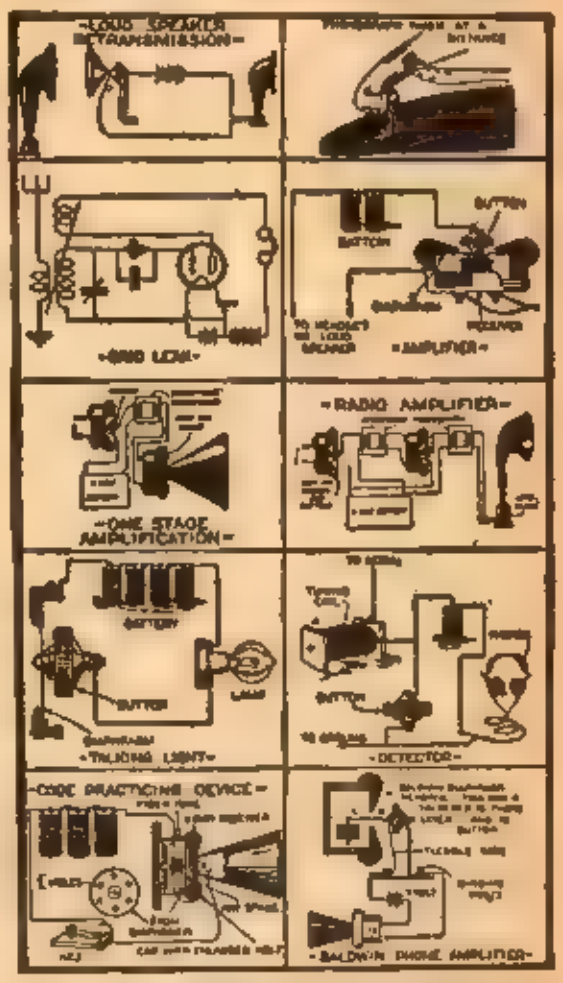

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THE READER AIRS HIS VIEWS

(Continued from page 753)

Spellbound

Editor, AIR WONDER STORIES

I am a student at the University of Wisconsin, smart as a whip (Yeah!) Maybe you won't believe that I am smart when I confess that I read AIR WONDER STORIES quite regularly—but anyway, I am a student.

Why do I buy AIR WONDER STORIES? Ask me something easy. I'll tell you anyway. After spending hours studying, I find a great deal of pleasure in picking up your magazine and in reading a *short* story. When I have finished the story, I am all set to wrestle with my Physics or Math—or what have you. BUT—if you are to start long serial stories, then don't figure on my twenty-five cents every month. Instead of studying, I should spend the whole month wondering and worrying what has happened to the hero inventor or his sweetheart who is captured by Desperate Desmonds of the air. Naturally, the old Profs wouldn't like that so much and I would soon receive my walking papers. 'Nuff said.

2205 West Lawn Ave.,
Madison, Wis.

(We are sorry Mr. ..... does not give his name, but that is probably because the university authorities read AIR WONDER STORIES themselves, and he would not wish to be found out so easily.

The excellent assistance our magazine is rendering this student in his academic work is typical of the interest in science it arouses wherever it is read. Many students thank us for our aid in making their studies more interesting, and their professors bless us for relieving them of the burden of interesting their students in science. *Editor.*)

IF you enjoy AIR WONDER STORIES you must read SCIENCE WONDER STORIES, its sister magazine. In SCIENCE WONDER STORIES you will find all of the good authors who write for AIR WONDER STORIES, and there are many stories that deal with aviation and, particularly, space flying and interplanetarian trips. Be sure to get the February issue now on all newsstands. Table of contents follows:

"A Rescue from Jupiter," by Gawain Edwards

"Can Man Free Himself from Gravity?" A symposium

"The Land of the Bipos," by Francis Flagg

"The World of 100 Men," by Walter Kateley

"Streamers of Death," by Henrik Dahl Juve

Willing to Explore Upper Regions

Editor, AIR WONDER STORIES:

Build a large rocket ship—large enough for one or two persons—of the type of Professor R. H. Goddard, and I will endeavor to explore the upper regions beyond the attraction of the earth. I would absolve you of any blame should I get killed or never return to the earth. Equip the rocket with a device for providing oxygen and give me food in tablet form. Equip the rocket with radio, and with a device to discharge additional rockets.

Is it a bargain?

Since I have to die some time, I wish to devote my remaining life to the advancement of Science.

OTIS B. S. MEYERS,
Box 133, Brookings, S. Dak.

(This is a whole-hearted and sincere desire to extend man's knowledge of his universe, and shows an admirable spirit. It is the spirit of such men as Mr. Meyers that has given us many of our great scientific discoveries. However, we must warn Mr. Meyers that it is not enthusiasm alone, not self-sacrifice, alone, that will cause the first rocket flight to outer space to succeed or fail. It will depend rather on the scientific ingenuity and foresight with which the trip is planned and executed. It will probably be necessary, therefore, that each member of such an expedition be a trained scientist.—*Editor.*)

(Continued on page 763)

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THE READER AIRS HIS VIEWS

(Continued from page 762)

Down with Serials!

Editor, AIR WONDER STORIES

If Miss Von Lessing is the "Joan of Arc" of the serial-less, then I nominate Mr. J. K. esslig as the "Robin Hood" of the non-serial masses, for, as he's right, I have three "silent" readers back of me, and I see no reason for serials in a magazine like AIR WONDER STORIES.

But remember—even though there's one little force crushed between the "What Aviation Means to Me" boys and the "Wingless Wonders" as they'll come next after *Aviation Forum*—I'll still shoot my quarter across for every issue. So, dear Mr. Editor, kindly don't take offense at the following remarks:

Down with the idea of serials! Is this a "Wild West" magazine, that we must have "Bang! Bang!" Then—"continued next week at this theatre?"

Also, when reading a good, exciting, story, one is liable to lose most of his idea of the story by waiting a month or two or even three to finish it.

And about Miss Von Lessing's "prize" argument of "patience": How she must enjoy AIR WONDER STORIES—just as much as a funeral!

I am only human—unlike some of the machine-like readers of AIR WONDER—and hence like to devour my copy as soon as possible. It's so nerve-racking to wonder how the serial is coming out for a whole long, dragging, month!

If you have a good 100,000-word story, put it in a QUARTERLY.

AIR WONDER and SCIENCE WONDER are about equal in quality, though AIR WONDER has the edge.

FRANK M. KELLY,
Kansas City, Missouri.

(Mr. Kelly's cry of "Down with serials!" is one of many that we have received. Other people object to serials on other grounds than the ones he mentions. However, we are thrashing this question out in a thorough manner. We want Mr. Kelly to know also that the QUARTERLY is a good but rare treat. It is possible, if his plan is accepted, to print only four long stories a year, whereas by having serials in the magazines we can print three or four times that many. We invite other expressions of opinion as to whether or not we should run serials in this magazine.—*Editor.*)

From a Youthful Critic

Editor, AIR WONDER STORIES:

Having been a reader of your magazine since it was put on the market, I believe that perhaps I am entitled to have "my say."

I'm only 12, and as mother has taught me politeness, I'm afraid I won't be able to accommodate you in your request for "brickbats." Speaking seriously, your magazine is one of the best on the market. The ideal, that of teaching science through interesting air yarns, is fine. The stories are better. Oh, by the way, whatever you do, *don't discharge Paul!* His drawing is one of the best features of the periodical.

Here goes for the stories (though my criticisms will probably be wrong):

Mere words can not express my admiration for the story, the "Ark of the Covenant." Its science was perfect, its plot, superb. Get Mr. McClure to write more stories, though I don't think any writer could duplicate that story.

"The Planet's Air Master" was good. I wish a sequel were written. The "Master" would not give up so easily, and the fools who are called officials wouldn't try to catch him.

"Beyond Gravity" was a great story, but I advise Mr. Repp to lay off love-making.

"The Yellow Air-Peril" is a reversion to the old race hatreds. But for all that, I liked the story. The science was there. I don't see, though, why the author had so many men killed. It didn't add interest to the story. Gave us more of Harl Vincent.

"Where Gravity Ends" was a typical science fiction story, exceedingly well written.

"Flight in 1999" was somewhat ridiculous. The science was good, but the "save-the-home" plot was antiquated and terrible. The system of names is feasible only in a story, which at the most, has a limited number of "monikers." Say! I want Bob Olsen because I've read him before. Every man must have his off-day.

"The Air Terror" was good. It at least departed from the conventional type of story where the erring hero, saved by the beautiful heroine, becomes good and marries her. Morrow is all right.

"The Silent Destroyer" was splendid, as was its sequel "The Sky Maniac." Henrik Dahl Juve should be given a chance to write many more stories. I liked the endings of the stories and the moral that it's not good to always look at old, seemingly useless things, with contempt. The Colt 45 and the hacksaw did what all that great civilization couldn't do.

"Through the Air Tunnel" was one fine story but the plot of the villain trying to ruin the heroine's father is moth-eaten. Anyhow it was Duncan Moore and not Jimmy Streeter who saved Mr. Townsend and Doris!

I liked the "Invisible Raiders" a great deal. Besides good science and plot, Mr. Repp injected a little good slang into it.

"The Robot Master" is entirely plausible, with extremely good science. Arnid though, must have been a man with a mighty strong character not to succumb to the temptation.

"Around the World in 24 Hours" is, I should say, a perceptible improvement on the speed of Phileas Fogg. I think, though, that the science came all in a heap, too quickly for digestion.

"The Air Spy" was so terrible that I'm surprised that your magazine published it. There is no plot, less science and an exceedingly lame ending.

In the November issue I have read two stories. "Beyond the Aurora" is a worthy successor to the "Invisible Raiders." "Suitcase Airplanes" was great.

So I conclude by saying: "Don't change a thing in AIR WONDER STORIES except the book reviews. Throw them out! "Aviation Forum" isn't so bad but "Aviation News of the Month" is dandy and Hugo Gernsback's editorials are something to be proud of. A few of us boys are forming a Science Fiction Club with our leading magazine AIR WONDER STORIES.

MORRIS ADELMAN,
3451 Cruger Place,
Bronx, N. Y. C.

(We are delighted to print so remarkable and sophisticated a letter from one so young. Evidently the writer has progressed far beyond the usual limit of twelve-year-old boys. He writes with a correctness which is refreshing, and his acute observations are sensible. We are proud to have such readers. We are glad to know that he is forming a "Science Fiction Club" with AIR WONDER STORIES as its leading publication. We will be very happy to do whatever we can to assist it.—*Editor.*)

Shorter and Sweeter

Editor, AIR WONDER STORIES:

Keep up the serials. Long may they thrill us. Also—we need a QUARTERLY.

Edmond Hamilton cannot be beaten, although Morrow and Repp are no slouches.

Please print lots of interplanetary stories. Best of luck.

E. C. HUSTIANSEN,
4226 Van Buren Street,
Chicago, Ill.

(This is short and sweet and to the point. As another opinion in the serial and anti-serial controversy, it is definite.

Interplanetary stories are now a part of AIR WONDER STORIES.—*Editor.*)

Wants Repp in Book Form

Editor, AIR WONDER STORIES:

I bought my first AIR WONDER magazine to-day, and I enjoyed it greatly. I have been reading SCIENCE WONDER since it began. Both are all that could be desired in good, sound, reading matter. I enjoyed every story, and I must say that your author, Mr. Ed Earl Repp, is certainly as good at writing aviation as he is at science. I guess I missed some of his aviation stories, and I wonder if at the end of the year some of both could be published in book form. I am sure that a good many readers would want this book. Repp's stories are really classics in my opinion, and ought to grace any library. I for one would purchase such a book. I think it should open with "The Radium Pool." I think this story is even better than "The Moon Pool" or "The Ark of the Covenant."

Mr. Repp is your best and most talented author and should be "in" every month. I was disappointed in not having a story of his in the current SCIENCE WONDER. But all your authors are fine. Dr. Keller is very good. So I've found that AIR WONDER is as good as SCIENCE WONDER any time and I will look forward to it every month from now on. I shall not miss either magazine.

You would be surprised how many of your magazines are being read by the boys at the naval base. Repp and Keller are the most popular writers here.

B. SNODGRASS,
Navy Base, San Diego, California.

(This eulogy of Ed Earl Repp should make any author do his utmost to write stories better than the ones which elicited the praise. We find that most of our readers are enthusiastic over Mr. Repp. We are grateful for Mr. Snodgrass' suggestions. *Editor.*)

(Continued on page 764)

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THE READER AIRS HIS VIEWS

(Continued from page 763)

Interplanetarian Stories in AIR WONDER

Editor, AIR WONDER STORIES.

AIR WONDER STORIES seems to be getting better with each issue published. The last installment of "Cities in the Air," by Edmond Hamilton is better than the first. I hope to see more of Edmond Hamilton soon. I place the stories as follows according to the formula used by Clarence R. Lertz of Fargo, N. D.

Class 1. "Cities in the Air", "Freedom of the Skies", "The Phantom of Galon."

Class 2. "The Flight of the Eastern Star"; "The Blue Demon"; "Flannencakes' Invention."

In answer to Wallace C. Wardner's letter I say, keep the "love element" in the stories. I am glad to see that you are at last starting interplanetary stories in my favorite magazine.

JACK DARROW,
4225 N. Spaulding Ave.,
Chicago, Illinois.

(Our correspondent expresses the sentiment voiced by most of our readers regarding Mr. Hamilton's stories, and we are in hopes that we can induce Mr. Hamilton to have one of his stories frequently in AIR WONDER STORIES. As our correspondent will already have noticed we are now beginning to publish interplanetarian stories in AIR WONDER STORIES magazine due to the great demand from our readers for this subject.—*Editor.*)

Which is Better?

Editor, AIR WONDER STORIES:

In asking us to determine whether SCIENCE WONDER STORIES is or is not better than AIR WONDER STORIES, you have placed a weighty problem upon our shoulders. I, for one, am glad to tackle it.

It is my humble opinion that SCIENCE WONDER STORIES is better than AIR WONDER STORIES in only one respect—its diversity and its wide field of science. An eminent essayist once stated "To get the best out of life one must vary his reading matter as well as his diet." AIR WONDER is restricted to only one field, while SCIENCE WONDER ranges from one topic to another. In all other particulars, such as illustrations, editorship, good stories, "Aviation News," and "Aviation Forum" it is just as good as SCIENCE WONDER.

The contest is very close, but in view of the above facts, I think SCIENCE WONDER wins by a very narrow margin.

After having read and absorbed thousands of science fiction stories, I think I am qualified to judge.

JULIUS UNGER,
786 Blake Avenue,
Brooklyn, N. Y. C.

(The weight of opinion as to which is the best magazine seems to be on neither side. Personally, we are glad of this for it must mean [if we can interpret our letters correctly] that they are both good. Are we right?—*Editor.*)

Were the Messages Overheard?

Editor, AIR WONDER STORIES:

Even though I am only a junior in high school, I would like to ask a few questions. In the November issue I class the stories as follows. Class A, 'Cities in the Air' and "When Space Ripped Open", Class B, 'Beyond the Aurora' and 'The Second Shell.' Class C, 'The Crystal Ray', Class D, "Suitcase Airplanes."

The last named seemed to me a silly, uninteresting story. In "Cities in the Air" the air chief of the American forces gives commands to the accompanying ships. Wouldn't the European forces hear them and follow their instructions? That seems like a weak point to me.

In the December issue the only story which I did not like was 'The Flight of the Eastern Star" it was more of an article than a story. In passing through the spout wouldn't the ailerons and elevators be crushed by the tremendous pressure of the water? Otherwise the rest of the stories were excellent. Paul is doing good work.

FREDERIC D. MORGENSTERN
895 West End Avenue, New York City

(Of course we assumed in "Cities in the Air" that the radio-telephony methods used by the opposing forces employed devices that would "seal" the message. Already, our scientists have been developing devices to "scramble" radio messages so that they will be an unintelligible mess of sounds to any listener not possessing a special type of apparatus. Therefore, such a development will certainly precede the extensive use of radio telephony in warfare.

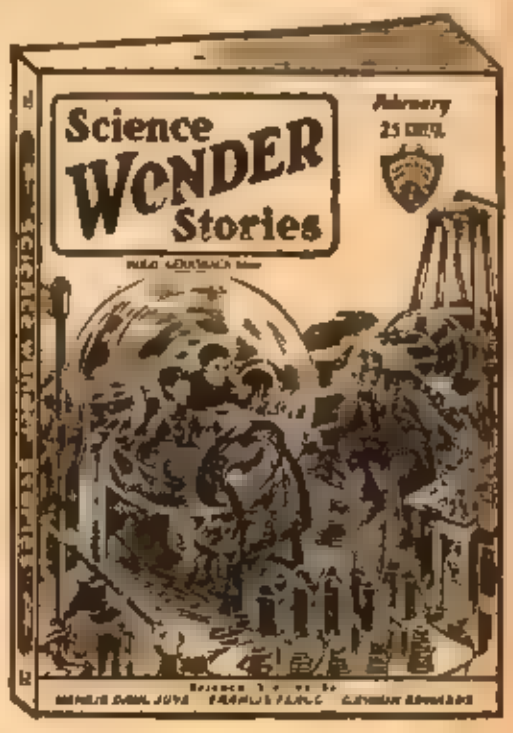
(Continued on page 765)

Can Man Free Himself From Gravity?

NOW that the airplane has freed man from his age-old imprisonment to the surface of the earth, people with intelligence and imagination are turning their thoughts more and more to the question, "Can Man Even Free Himself From Gravity?"

Through our stories we have continually pictured what a change there will be in human life if, by some means, gravity were nullified even locally. In order to get the best scientific information on this question, we invited those of our Associate Editors whose field of study connected them with this question to give us a brief resumé of their opinions. These illuminating remarks of a half dozen foremost scientists of the country, together with a statement by Professor R. H. Goddard, the American exponent of rocket flying, are presented in the February issue of SCIENCE WONDER STORIES.

We are sure this is one of the most remarkable collections of scientific opinion on a vital subject that has been gathered in recent times.



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To New Readers

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AIR WONDER STORIES
98 PARK PLACE NEW YORK

THE READER AIRS HIS VIEWS

(Continued on page 764)

The pressure of the water in a "waterspout" is usually over-estimated. In reality, the spout is hollow, and largely mist. The water is drawn upward, the greater pressure being upward However, the question is one of the construction of the planes. We must assume that the captain of the "Eastern Star" knew that the ailerons and elevators would be strong enough to resist whatever pressure there was.—*Editor.*)

IF you have not as yet seen the WINTER SCIENCE WONDER QUARTERLY

WATCH FOR THE SILVER COVER

Be sure to procure a copy immediately from your newsstand.

This magazine specializes in interplanetarian science fiction and the Winter issue contains the following marvelous stories:

"The Moon Conquerors," by R. H. Romans

"The Osmotic Theorem," by Capt. S. P. Meek, U.S.A.

"Into the 28th Century," by Lilith Lorraine

"Underground Waters," by A. C. Webb, M. D.

Do not miss the Winter issue now on all newsstands

Why Not Air Quarterly?

Editor, AIR WONDER STORIES:

I have been reading your magazines for the past four years. Everyone of them has great stories. Victor MacClure's "Ark of the Covenant" is my choice for first place. "Men With Wings" was a close second; Mr. Juve's "The Silent Destroyer" and its sequel "The Sky Maniac" were equally good.

SCIENCE WONDER STORIES has a quarterly. How about having an AIR WONDER QUARTERLY?

ELI MELTZER,
Brooklyn, N. Y.

(The question of an AIR WONDER QUARTERLY is now under consideration. We have hesitated to put it out; chiefly because many loyal fans have begged us not to. "If you put out another magazine" they say, "we will have to buy it and we will go broke."

So what are we to do?

However the comments that we are getting on the question will help to settle it. Let those who want an AIR WONDER QUARTERLY *assert* themselves! —*Editor.*)

Found the Teacher Reading It

Editor, AIR WONDER STORIES

I have just finished the December issue of AIR WONDER STORIES, and I think that there is no other book or magazine (with the exception of the SCIENCE WONDER STORIES) that can compare with it.

My only objection to the magazine is that it comes out once a month, and as soon as I start reading it I don't stop till I have read every single story, and the articles in the back.

Although I am only 15, I enjoy the magazine and the possibilities of the stories; even though, when I take the magazines to school, the kids laugh and say the books are full of lies. But that's because they don't like science fiction. I don't mind them I read on. My mother often gets angry at me for reading these stories because I get so deeply into the story that when she calls me I am not there, I am in a laboratory of a master mind, or traveling around the moon. The stories don't prove interesting until you can get a picture in your mind of what is happening.

I got into trouble with one of my teachers for reading the November AIR WONDER STORIES in class when I should have been working. The teacher took it and told me to come in after school and get it. I found her reading it when I went for it. She borrowed it, and the next day I got it back, and she said she sat up later than her usual bed-time reading it. The next day she got the latest SCIENCE WONDER STORIES. I got you another reader—but at what a cost! I am not to bring either magazine to class, or she will keep them, instead of buying them. Don't worry, it will take more

(Continued on page 766)

Would this law let you marry?

Many States are quietly passing Eugenics laws. They are trying to protect innocent women from a living death with weak, puny, run-down males who have no more principle than to bring offsprings into this life to face the taunts, sneers and ridicule of associates, so these States tell them.

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You mustn't go on into life a weakling. You don't want to be a broken down wreck at an age when you should be vigorous and ambitious. You don't need to. Hundreds of happy vigorous men have been lifted out of the mire of ignorance into the joyous sunshine of health, success and happiness by sending for my book I have no drugs, or dope to recommend in my book. It tells how Nature restores and heals.

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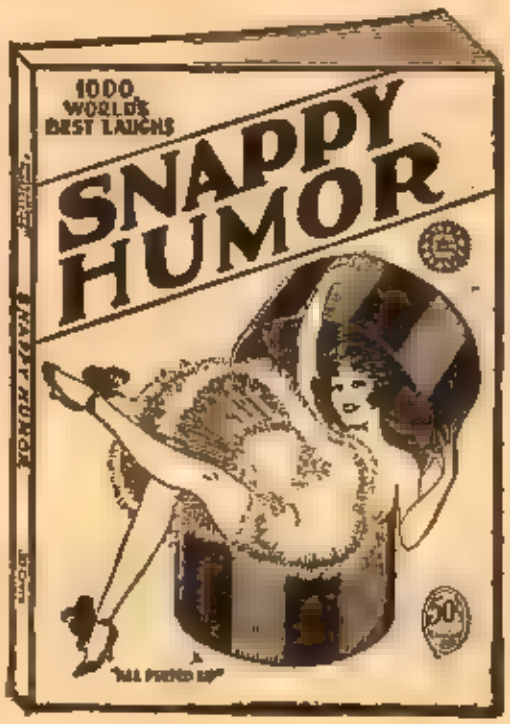

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THE READER AIRS HIS VIEWS

(*Continued from page 765*)

than that to keep me from getting every one that comes out.

Be sure to put out an AIR WONDER QUARTERLY. I am looking forward to some good stories from both magazines (not that the ones I have weren't good—but continue to do so.)

WARREN GENTZ,
Oklahoma City, Oklahoma.

(That AIR WONDER STORIES is of absorbing interest to young people and to older ones alike is proved by the fact that the teacher stayed up late reading the magazine she had confiscated. We find that, when a person once reads one of our magazines, he usually becomes a regular reader. What the reason for this is we do not presume to say—all we can state is that we always try to make each new issue more interesting than the one before.

An AIR WONDER QUARTERLY is under consideration.—*Editor*.)

Defends Forum and News

Editor AIR WONDER STORIES:

I hereby take the opportunity of throwing a "brick-bat" at Mr. Jack Darrow of Chicago, (with your kind permission, of course). He states in his letter that AIR WONDER STORIES is a fiction magazine (true), but where he gets the idea that your "Aviation Forum" and "Aviation News" should be "scrapped" for "his" benefit is what I'd like to know. I think the two departments mentioned above are splendid. What ever you do don't "kick them out" of the air.

Personally, I like AIR WONDER STORIES better than SCIENCE WONDER STORIES, even though they are *both* the best ever. . . .

"Keep up" the good work, and here's one person who will continue to avidly devour your literature.

L. L. MILLER,
Albany, Ore.

(These exchanges of opinion such as the answer of Mr. Miller to Mr. Darrow's letter are what give us the real index of the feelings of our readers. Anyone else with a definite point of view pro or con is invited to write us. "The more the merrier." We have had many letters on the subject of the "Aviation Forum" and "Aviation News" and the great majority have been in favor of keeping them. We are also interested to get Mr. Miller's reaction to the comparison between SCIENCE WONDER STORIES and AIR WONDER STORIES. Since they are both our children we are impartial. But our readers must feel a preference. Tell us, which do you like better?—*Editor.*)

The Length of Serials

Editor, AIR WONDER STORIES:

Just finished reading "The Reader Airs His Views" in the December issue and was agreeably surprised to find my letter in print. I also got quite a kick from Miss von Lessing's letter in the same issue. The serialists are fortunate in having her on their side. According to the letters you have received so far regarding serials, it looks like we non-serialists will have to give up with our 4½ minority. But still I don't favor three serials in each issue as Miss von Lessing suggests. I am not death on serials, if they are like "The Ark of the Covenant"; but three issues should be long enough for the longest serial.

In my previous letter referring to book length stories I did not mean stories like those in the QUARTERLY, which run about 70 pages. Between 30 and 40 pages would be about right for an issue, if "The Shot Into Infinity" is of average book length. Three stories an issue is about right, or even four; one about 35 pages in length, a serial and a short story or two short stories.

Which is best? As to the actual percentage of stories liked and disliked I slightly favor AIR WONDER STORIES; but if it came to a showdown and I could have only one of the two I would take SCIENCE WONDER STORIES for the same reason Mr. Kurzer gave in the December issue. I think every one who has read both magazines from the beginning will agree there.

Can you give me the date SCIENTIFIC DETECTIVE MONTHLY will be out?

CLARENCE R. LIETZ,
1333 Seventh Ave.,
Fargo, North Dakota.

(This excellent summary of the controversy between the serialists and the non-serialists has the advantage of stating also how long the writer likes to have his serials. This is another interesting point, and we shall be glad to consider correspondence on the subject of the length of serials, as well as on their appearance at all.

The SCIENTIFIC DETECTIVE MONTHLY will be on the newsstands with its second issue about the time this magazine reaches its readers. The January issue appeared on December 15th 1929.—*Editor.*)

BOOK REVIEWS

HOW TO FLY, by Barrett Studley. 291 pages, stiff cloth covers, illustrated, size 8¼ by 6. Published by The Macmillan Company, New York. Price, $3.00.

Lieutenant Barrett Studley, of the United States Navy, author of *Practical Flight Training*, and of *How to Fly*, is one of the best known aviation authorities in the United States. The latter work, the author's latest, is a development of the *Flight School Manual* of the Navy Air Station at Pensacola, Florida, where the author is an instructor.

While *Practical Flight Training* is intended primarily for the use of students actually under instruction, and is in reality a detailed technical analysis of flight training, *How to Fly* describes in a non-technical way the problems met in learning to fly. In other words, it is most interesting to the person genuinely interested in aviation; to the one who wants an intelligent appreciation of its difficulties, and who desires to understand precisely what an author means when, in a story, he describes the manoeuvers of an aviator.

The great number of photographs and diagrams with which the volume is illustrated add tremendously to the interest of the work, and to the reader's understanding of it. Lieutenant Studley, after devoting chapters to the history of aviation, with special attention to the development of its modern phases, tells just why and how an airplane flies; and then takes the reader with him into a fascinating account of the steps necessary in learning to understand the various aviation terms and technicalities and in learning to fly.

One of the most interesting points of *How to Fly* is the style in which it is written. The book abounds in fascinating anecdotes and in cleverly written passages. It displays everywhere the immense practical knowledge of the author, who is particularly qualified, through his years of experience as an instructor, to understand the problems of beginners. Of course, no one can learn to fly by himself, without an instructor; but this book will be a valuable aid to all who wish to supplement their practical training by the use of a source of unusual practical information.

PILOT'S LUCK, drawings by Clayton Knight, with excerpts from stories by Elliott White Springs, Captain A. Roy Brown, Floyd Gibbons, and Norman S. Hall. 72 pages, profusely illustrated. Stiff cloth-decorated covers, size 11½ by 8¼. Published by the David McKay Company, Philadelphia. Price, $2.50.

This is the ideal gift book for the aviation enthusiast. Its format and makeup are, it seems, intended to make the book eminently appropriate for this purpose. Clayton Knight won fame in the war as an ace, and his drawings of airplanes in action have made him known all over the country. His illustrations for stories by Elliott White Springs and Captain A. Roy Brown, both airmen during the war, are replete with action that can be given only by an experienced flyer, who has known what it is to be in a "dog fight." Floyd Gibbons, author of *The Red Napoleon*, is the author also of *The Red Knight of Germany*, and the illustrations for this biography, which appeared first in *Liberty*, are quite as good as the others. In fact, this collection of drawings which have already appeared is certain to establish Clayton Knight's reputation more firmly than ever.

The value of the book lies in the inimitable drawings of airplanes in action. No other artist, in our estimation, combines an expert knowledge of flying with so unusual a talent as Knight's. The artist has caught the very spirit of the Air Corps in time of war; the dashing, reckless, spirit that made it one of the most formidable fighting forces in the world. Followers of aviation will cherish *Pilot's Luck* as a book to be enjoyed again and again.

LINDBERGH FLIES ON! by Earl Reeves. 292 pages, illustrated, stiff cloth covers, size 7¾ by 5¼. Published by Robert M. McBride & Company, New York. Price, $2.00.

This is a book, not only about Colonel Lindbergh, but also—indeed, mainly—about the development of aviation since the Colonel's historic flight in 1927. Most of the material is genuine first-hand information, received from the most prominent aviators and aviation executives of the day. The chapter headings may give some idea of the material covered in this very instructive and up-to-the-minute volume.

The famous "Casey" Jones, one of the country's best pilots, and president of the Curtiss Flying Service, contributes three chapters; "Lindy and Aviation Since the Paris Flight;" "Lindbergh's Biggest Job;" and "A Ride on the Lindbergh Limited." These personal experiences, added to a chapter written by Mr. Reeves on the hero's boyhood, give a complete picture of the career of Colonel Lindbergh. In addition, they delineate very clearly the present condition of aviation, the future prospects, and the reasons why aviation is expected to become a world-factor in international relations.

Richard E. Hoyt, New York banker, and chairman of Pan-American Airways, discusses his plans for "empire building" by the linking of all the Americas by air—something that has already taken place. Grover Loening, famous as the builder of amphibian planes, gives some constructive criticism on several phases of the industry which need improvement. There are chapters on Fokker and Fairchild, famed as builders of planes; and Paul Henderson, "Father of the Air Mail," discusses the opportunities in flying. There is a chapter on Commander Byrd; and the concluding section is a detailed report of important flights and flight records from 1891 to the present time. This is not the least valuable portion of an extremely interesting book.

AIR, MEN, AND WINGS, by George and Gilman. 263 pages, illustrated, stiff cloth covers, size 6 by 9. Published by Robert M. McBride & Company, New York, and the Junior Literary Guild. Price, $3.50.

Art Goebel, winner of the Dole Race to Hawaii, says of this book: "Out of *Air, Men and Wings* every boy and girl, every young man or woman, and every adult can get an excellent general knowledge of aeronautics without delving into a dry text book." With this estimate we agree. The outstanding characteristic of the book is its absence of technical language, usually one of the most discouraging features of a work concerned with an interesting subject.

The volume is not for the aeronautical expert, or for the flyer; it is for the average person who has no time to study the many and varied technical points connected with the subject of aviation, but who wishes to keep abreast of the times, and who desires to possess a working knowledge of a science and an industry.

Starting with the history of man's conquest of the air, the book leads naturally to a simple and understandable explanation of the science of aeronautics—telling just what makes a heavier-than-air machine fly, and describing vividly the various steps in the process through which man passed before he learned these principles. In addition, the person with mechanical aptitude is given instructions for building his own airplane models; and there is a clear description of aviation instruments and the requirements for flying. A glossary at the end of the book makes every aviation term perfectly clear; and anyone who has read *Air, Men, and Wings* with care will be rewarded with a comprehensive outlook upon a science which is occupying a great deal of attention at the present time.

SKY HIGH, THE STORY OF AVIATION, by Eric Hodgins and F. Alexander Magoun. 337 pages, illustrated; stiff cloth covers; size 5⅓ by 8¼. Published by Little, Brown, and Company, Boston. Price, $2.50.

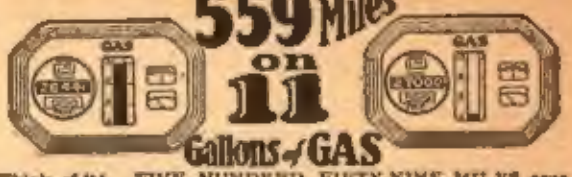
This book is fittingly dedicated "To the memory of those persistent gentlemen who, since the recorded history of flight began, were always quick to assert that *'it could not be done'*—in the hope that this story of courage and sacrifice may make them turn, now and then, uneasily in their graves."

The history of aviation as we know it goes back 150 years, and *Sky High* covers in detail every important development made since man conceived, and tried to make practical, the idea of flight. And, though the history of flight goes back only 150 years, the idea of flying is thousands of years old. We have the prehistoric story of Icarus and Daedalus. In the fourth century B. C. a Greek, named Archytas, built a wooden pigeon—not a passenger-carrying bird—which was able to remain aloft for some minutes. The emperor Nero was interested in flight; and the story continues down to Roger Bacon, an English scholar, who lived about two hundred years before Columbus; then to Leonardo da Vinci, the great artist, who was also a great scientist, and who invented an "aerial screw." Thence we go through a list of pioneers until we reach the Montgolfiers, Frenchmen who constructed the first balloon.

From the day of the Montgolfiers until the present, the volume, in its thirty-two detailed and absorbing chapters, goes into every phase of aviation that has been of any importance because of its success as well as many that were important because of their failure. It is necessary for men to know what to avoid, as well as to know what to do.

The book is illustrated with many rare drawings of the first balloons and heavier-than-air flight devices, and with many photographs taken in the Smithsonian Institution. The pictures of disaster are remarkable in themselves; and remind the reader that the present status of aviation has not been attained without the sacrifice of thousands of lives and the shattering of thousands of dreams.

Over the Mountains from Los Angeles 559 Miles on 11 Gallons of GAS



Think of it! FIVE HUNDRED FIFTY-NINE MILES over rough mountainous country burning only ELEVEN GALLONS OF GASOLINE. Imagine more than FIFTY MILES TO THE GALLON. That is what the WHIRLWIND CARBURETING DEVICE does for D. R. Gilbert, enough of a saving on just one trip to more than pay the cost of the Whirlwind.

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This is a fine imported combination microscope. Really two instruments in one. One end used for high magnification, such as seeing bacteria in milk or water. Other end to see parts of insects, flower specimens, etc. Finished in gold brass. Magnifies about 25 diameters.

No. 8510 Florescope. Prepaid **65c**

Microscope

Here is a real high power imported microscope for instruction and laboratory work. Has regulation rotating light mirror. Has adjustable lens for correct focusing. With it come 3 specimen slides. Entirely brass. Packed in neat leatherette box. Magnifies about 10 diameters.

No. 8517 Microscope. Prepaid **$1.90**

Magnifier

This fine folding pocket magnifying glass, also called linen tester, is made entirely of gold lacquer brass. Has powerful lens that magnifies everything 10 times. Has fixed focus. Just open it and it is ready. When folded this magnifier occupies a space about as large as a quarter and twice as thick.

No. 8516 Magnifier Prepaid **35c**

Ooh-La-La Ring

Handsomely carved platinum finish, [illegible] just like any other ring. But, oh boy, wait till you look through the "VIEW." Strong magnifying glass shows French actress when viewed against light. Ring has large imitation diamond. When ordering enclose a strip of paper giving size of your finger.

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Periscope

See what's going on behind your back with this Sechachoscope. Used like a magnifying glass. No one knows you're watching them. Gives you "eyes in your back." This article is made in molded bakelite and its size is 3"x1¼".

No. 8504 Periscope. Prepaid **25c**

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A real high-powered imported pocket microscope for instruction and laboratory work. Has adjustable and automatic lens for correct focussing. Comes with one prepared subject and three specimen glass slides. Entirely made of lacquered brass. Packed in a neat leatherette box. Magnifies 40 diameters.

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10c Compass 10c

Fine imported magnetic compass. ACCURATE Pocket size. Invaluable for hikers, automobilists. Often saves $10.00. Use it to tell five electric wires; make your own galvanoscope. Fully nickel plated. The actual article is about one-half again as large as illustration shown.

No. 8507. Compass Prepaid **10c**

X-Ray Tube

With this little instrument you apparently see through your hand, cloth, wood, stone and other objects. See the bone in a pencil, the stem bone in a pipe, the bones in your fingers. An amazing optical illusion that no one has ever satisfactorily explained. Startle the girls by showing them what this tube can do and let them imagine the rest.

No. 8490. X-Ray Tube, Prepaid.. **10c**

Wonderscope

NEW! Greatest pocket microscope invented. Looks like a fountain pen and ACTUALLY MAGNIFIES 25 TIMES. Hair looks as big as a rope. See the pores in your skin. Has slide adjustable lens. For home, laboratory or shop. Full black enamel with clip. Its size measures 5"x¾". Must be seen to be appreciated.

No. 8502. Wonderscope A— Prepaid **95c**

No. 8632 Wonderscope B—Same as above but adjustable to the amount of light available. Prepaid **$1.35**

Luminous Paint

Makes your own luminous articles. Paint watch and clock hands, electric light switches, push buttons, keyholes, house numbers, etc. 1,000 uses. Articles treated stand out brilliantly in dark. The darker the room, the more brilliancy.

No. 8508 Luminous Paint, Prepaid **25c**

No. 8508-A Large Size ... **$1.00**

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Bluffgun

Bluff your friends with this gun. Made of composition metal handsomely nickeled. Exactly same size, weight and shape as real article. Fine to bluff burglars. Used also as desk paper weight. Size of this gun is 6¼" long and 3" wide.

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A real Cartesian diver—Can you explain how it works? A little glass imp placed in a bottle of plain water and sealed with special rubber cap, dances up and down in the liquid at your will. Will perform unique antics. An interesting, amazing and scientific novelty. Bottle 4 inches high.

No. 8375. Imp in Bottle. Prepaid **35c**

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A REAL laboratory microscope that stands 6" high, comes complete with forceps, 2 prepared specimen slides and 2 blank glass slides, all packed in a cherry wood box with brass hinges and fittings. Made entirely of lacquered brass, with powerful lenses. Entirely demountable to facilitate cleaning. Has arcade (open both sides) frame and rotary reflecting mirror. Made in three models for use in home, office, or laboratory.

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Big Magic Set

A chest of magical apparatus and directions for performing TWELVE AMAZING MAGICAL FEATS. An entire evening's entertainment can be given with them. Includes the Magic Vanisher, Cigarette Vanisher, Rice Coins, Master Memory, Beads on String, Obedient Ball, Vanishing Watch, and many others. Biggest value ever offered, worth double the price we ask.

No. 8712. Big Magic Set. Prpd. **$1.00**

Real Pistol

Here's a real pistol, not small enough to be used as a watch charm. Illustration is full size. Imported, best European workmanship. Excellent reproduction of standard pistol. Cut shows pistol broken open to load blank cartridge. When trigger is pulled, cartridge goes off with a loud BANG, that can be heard for a block. Pistol entirely made of steel, nickel plated. Handle is beautifully engraved. Octagonal barrel. Comes in box, with cleaning rod and 25 blank cartridges AT NO EXTRA CHARGE. (As explosives are prohibited to go by mail, pistol is sent express collect).

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No. 8509A Set of 25 Cartridges, by ex. press collect **25c**

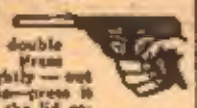
Opera Glass Charms

A pretty and unique watch charm. ¾"x1". Exact duplicates of real Opera Glasses. Powerful lenses that clearly magnify the view. Assorted views, scenic and French actresses. Fitted with ring to attach to watch chain. 2 VIEWS to each charm.

No. 8585. Rose Opera Glass Charm. Prepaid **25c**

No. 8586. Rolled Gold Opera Glass Charm. Prepaid **75c**

Cigaret Gun



NEW. Actually shoots cigarettes. New improved double action model. From the trigger lightly — out shoots a cigarette—press it again, back flies the lid revealing it a cigarette case. Looks like a real automatic. Made entirely of metal, with oxidized stocks, barrel and fittings. The same size as the real article, and weighs but 13 ounces.

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Anyone can play the Humanatone. A unique and novel musical instrument played with nose and mouth combined. Produces sweet toned music similar to a flute. No fingering—no lessons. A little practice and you'll get the knack. Made entirely of metal. Nothing to get out of order or wear out.

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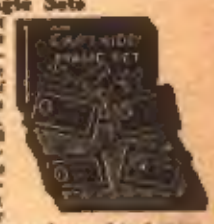
Magic Sets



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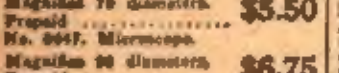

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No. 8649. Telescope. Three draw. 12¾". Prepaid **$3.50**

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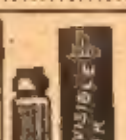

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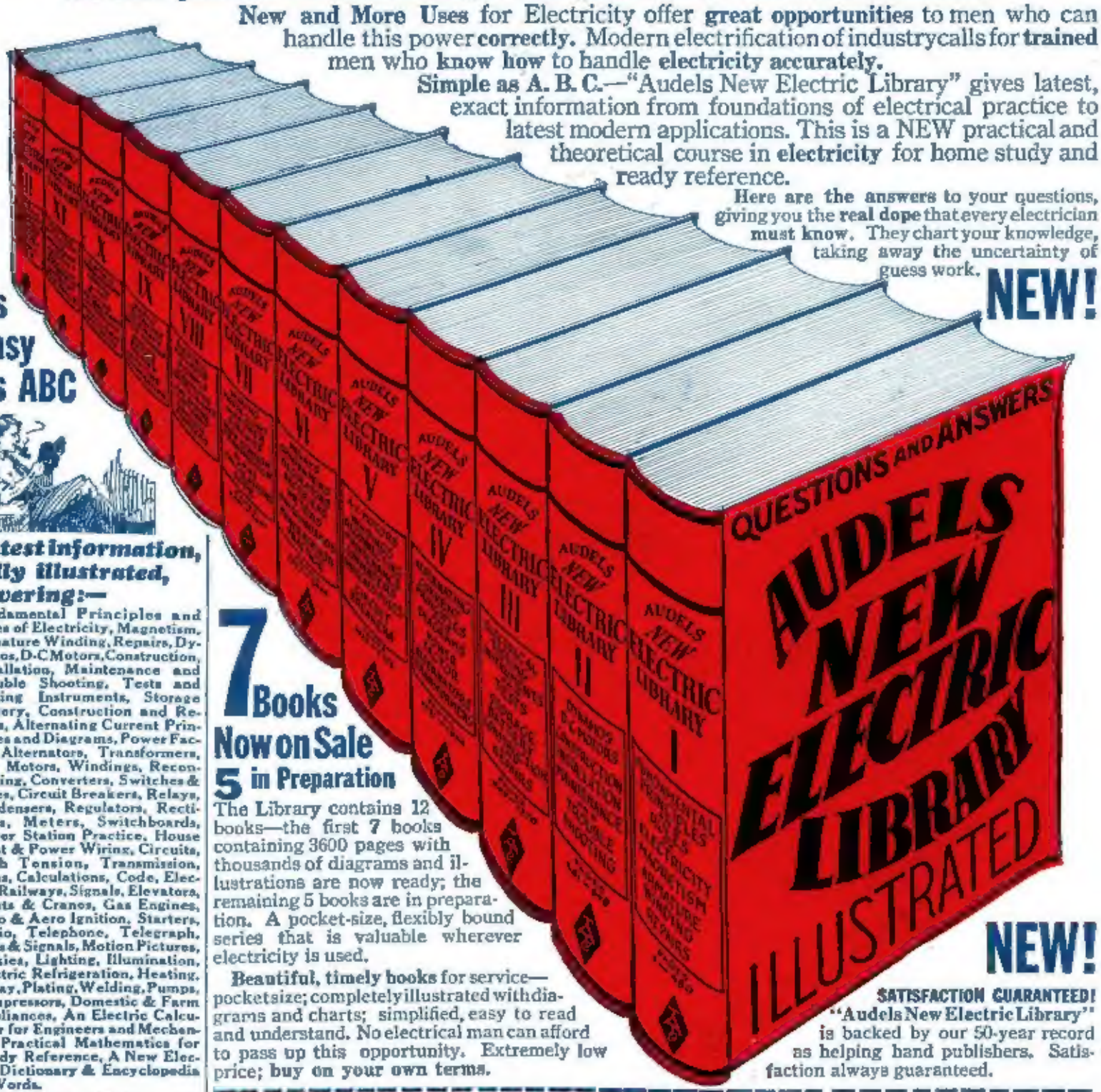

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EMPLOYED BY _____ Ger

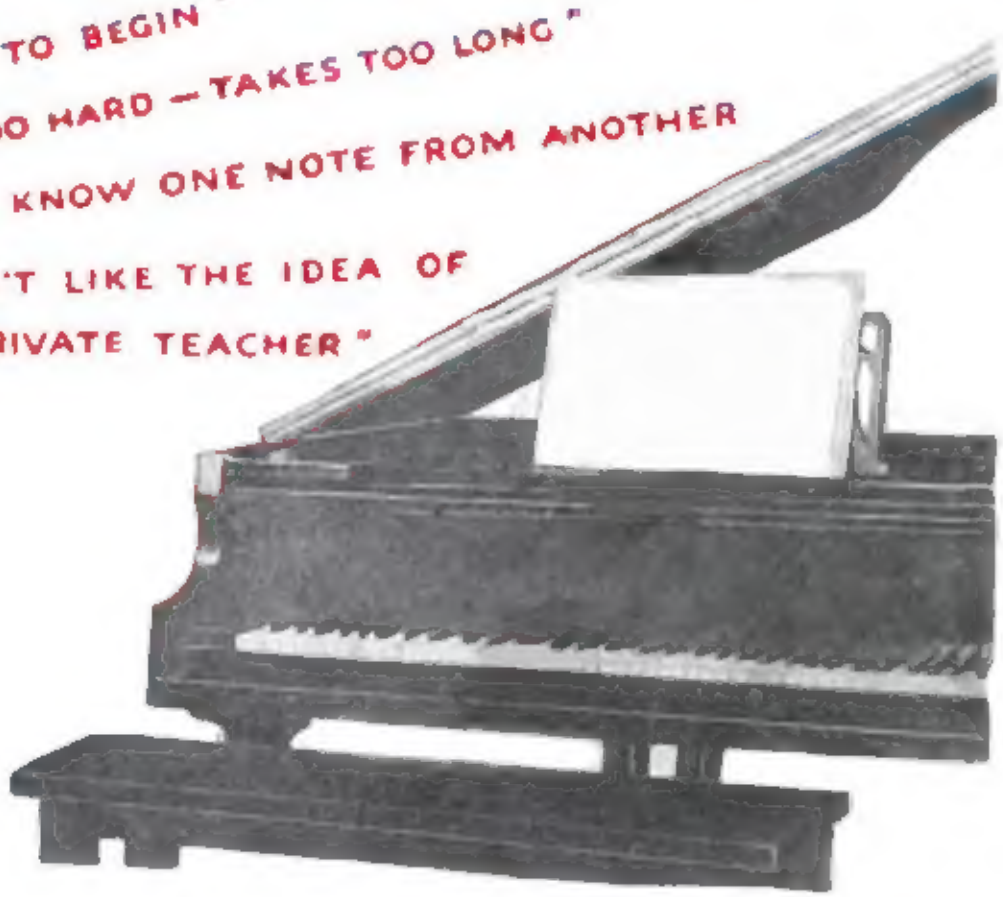
No alibis *now* for not learning to play!

"AFRAID TO BEGIN"

"IT'S TOO HARD—TAKES TOO LONG"

"I DON'T KNOW ONE NOTE FROM ANOTHER

"I DON'T LIKE THE IDEA OF A PRIVATE TEACHER"



Easy as A-B-C to become a popular musician on any instrument this "no teacher" way

WHY let your imagination run loose and keep you from becoming a popular musician? Haven't you heard that there is a way of learning to play your favorite instrument in a few short months? Without taking lessons from a teacher! Without paying expensive fees! Without any tiresome technique or dry-as-dust exercises to struggle through—a way that has been vouched for by over a half-million people in all parts of the world!

The U. S. School of Music has completely removed all the difficulty, boredom and extravagance from music lessons. It has made the reading and playing of music so downright simple that you don't have to know one note from another to begin.

It's *So* Easy!

Your own home is your studio. The lessons come to you by mail. They consist of complete printed instructions, diagrams, and all music you need.

You study with a smile. For instead of just scales you learn to play tunes from actual notes — right from the very first lesson on. And you're never in hot water. First, you are *told* how a thing is done, then a pictures *shows* you how, then you do it yourself and hear it. No private teacher could make it clearer or easier.

"Goodbye Blues"

Sooner than you realize you will be bringing cheer to the folks at home with your playing. Gradually you gain confidence and professional expression. Then parties, popularity, orchestra work follow in short order. You'll know how good it feels to be out of the wallflower class and into the whirl of things . . . to be able to provide musical enjoyment for others whenever you are called upon.

The abundance of joys that music can bring into anyone's life is now yours to share. Let the time-proven and tested U. S. School home-study method help you to increased pleasure and financial gain. Bear in mind no matter which instrument you select—the cost of learning in each case will average the same — *just a few cents a day!*

Pick Your Instrument

Piano	Piccolo
Organ	'Cello
Violin	Sight Singing
Drums and Traps	Ukulele
Guitar	Hawaiian Steel Guitar
Mandolin	Clarinet
Harp	Flute
Cornet	Saxophone

Trombone
Voice and Speech Culture
Harmony and Composition
Automatic Finger Control
Piano Accordion
Italian and German Accordion
Banjo, (Plectrum, 5-String or Tenor)

Free Book and Demonstration Lesson

Our wonderful illustrated Free Book and our Free Demonstration Lesson explain all about this remarkable method. They prove just how anyone can learn to play his favorite instrument in half the time and for just a fraction of what old slow methods cost. The booklet will also tell you all about the amazing new *Automatic Finger Control.*

If you really want to learn to play—if new friends, good times, social popularity, and increased income appeal to you—take this opportunity to make your dreams come true. Now! Sign the coupon and send it before it's too late. Instruments supplied when needed, cash or credit. U. S. School of Music, 502 Brunswick Building, New York City.

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